JANUARY, 1939

ANNUAL REVIEW OF THE INDUSTRIES

TN1
.P65

"THERE IS NO FINER EQUIPMENT THAN 'CATERPILLAR'"

Mr. T. F. Baxter *(left)* and his foreman, Mr. T. D. Folkorth *(right)* seated beneath the 125-horsepower "Caterpillar" Diesel Engine owned by the Baxter Cartage Co., Detroit, Michigan. Driving a Universal crushing-plant, this engine operates — in extremely dusty conditions — 16 hours a day, on only 3 gallons of 7 1/10c fuel an hour; saving $10.45 a day on the former power-costs! Average hourly output is 75 yards.

BACK IN 1927, Theodore Baxter bought two "Caterpillar" track-type Tractors for his first road-job in Michigan. "They were well-built machines," Mr. Baxter says, "and gave remarkable service." As a matter of fact, to show you how highly Mr. Baxter regarded those machines, he later bought two "Caterpillar" Diesel D8 Tractors . . . and, just recently, purchased a 125-horsepower "Caterpillar" Diesel Engine to operate his crushing-plant.

Asked about the engine's performance, Mr. Baxter gave these figures: It operates 16 hours a day on only 3 gallons of 7 1/10c fuel an hour . . . averages 75 yards of output per hour . . . saves $10.45 *a day* on his former power-costs!

Mr. Baxter comments: "I do not think there is any finer equipment built than 'Caterpillar.' It provides everything I want — including real service, when and where I want it. To me, it has meant easier profits."

This is not an isolated case of earnings, savings and satisfaction. For throughout the pit-and-quarry field, "Caterpillar" Diesel equipment is giving hour after hour of dependable service — *making profits easier on operations exactly like your own!*

To learn more about these engines and their sturdy construction that saves on maintenance . . . their simple design and precision build that keep them free from frequent check-ups and adjustments . . . their sparing use of low-cost fuel . . . see your nearest "Caterpillar" dealer or write direct. There are nine sizes — 32 to 160 horsepower.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

CATERPILLAR DIESEL POWER

REG. U.S. PAT. OFF.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

JUN 30 1939

#268
6011

880 June 29, 1940

A FEW SUGGESTIONS FOR PROFITABLE MODERNIZATION

● Plan for lower operating costs and a better product by making replacements and additions to your equipment now. Here are a few suggestions. There are others. Consult Link-Belt.

Link-Belt Company, Chicago, Philadelphia, Indianapolis, Atlanta, San Francisco, Toronto, or any of our other offices, located in principal cities. 7615

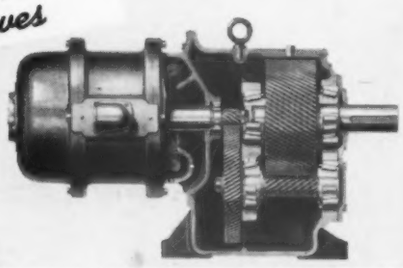
Reduce Excavating Costs

The Speed-o-Matic hydraulic-pressure-control shovel-dragline transfers the physical work of operation to the power of the machine itself. Short, easy, wrist motions move the control levers. Banishes operator fatigue . . . Maintains top efficiency . . . More yardage at lower cost.

Screening to Meet Rigid Specifications

Supplement your rotary screens with Link-Belt vibrating screens to obtain a better grading of the smaller sizes of gravel or stone. Rotary screens for better washing—vibrating screens for better sizing. The combination of both rotary and vibrating screens assures your ability to meet the most rigid specifications.

Replace Open Gear Drives



Greater efficiency as well as safety can be obtained by using Link-Belt speed reducers. The Link-Belt line includes herringbone gear, worm gear and motorized helical gear reducers as well as variable speed transmissions, silent chain and roller chain drives.

Anti-Friction Belt Conveyors

Replace your old, plain-bearing belt conveyor idlers with modern Link-Belt anti-friction bearing idlers. Save power, assure dependability and cut down maintenance costs.

Prolong the Life of Conveyor Belts

Conveyor belts should run practically central with their conveying or supporting idlers to avoid possibility of injury to belt edge in running against chutes, etc. When a belt does run with too much misalignment, the use of Link-Belt self-aligning idlers, spaced at intervals, corrects this condition by automatically "training" the belt to a central position.

Sand Recovery

The Rotoscoop is a perfected sand dewatering unit which is capable of recovering fine grains and discharging dry enough for truck transportation. Send for Folder No. 1463.

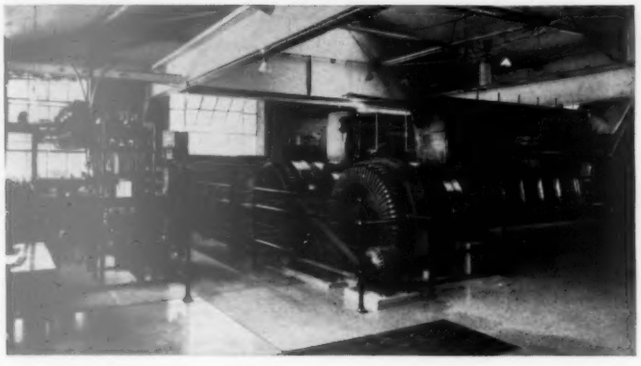
LINK-BELT

Equipment for Handling Sand, Gravel, Stone

PIT AND QUARRY, January, 1939. Vol. 31, No. 7. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the act of March 3, 1897.

Questions About Diesel Power?

BRING THEM TO US AT THE CONVENTION



Again, as last year, we will be on hand at the Manufacturers' Exhibit of the Annual Convention of The National Crushed Stone Association, to be held at Cincinnati's Netherland Plaza Hotel, January 30, 31, and February 1, 1939.

We'll be happy to greet you and tell you how Superior Diesels are saving money in your industry.

Superior DIESELS

HEAVY DUTY MODELS: 50 to 810 H. P., 250 to 720 R. P. M.

111

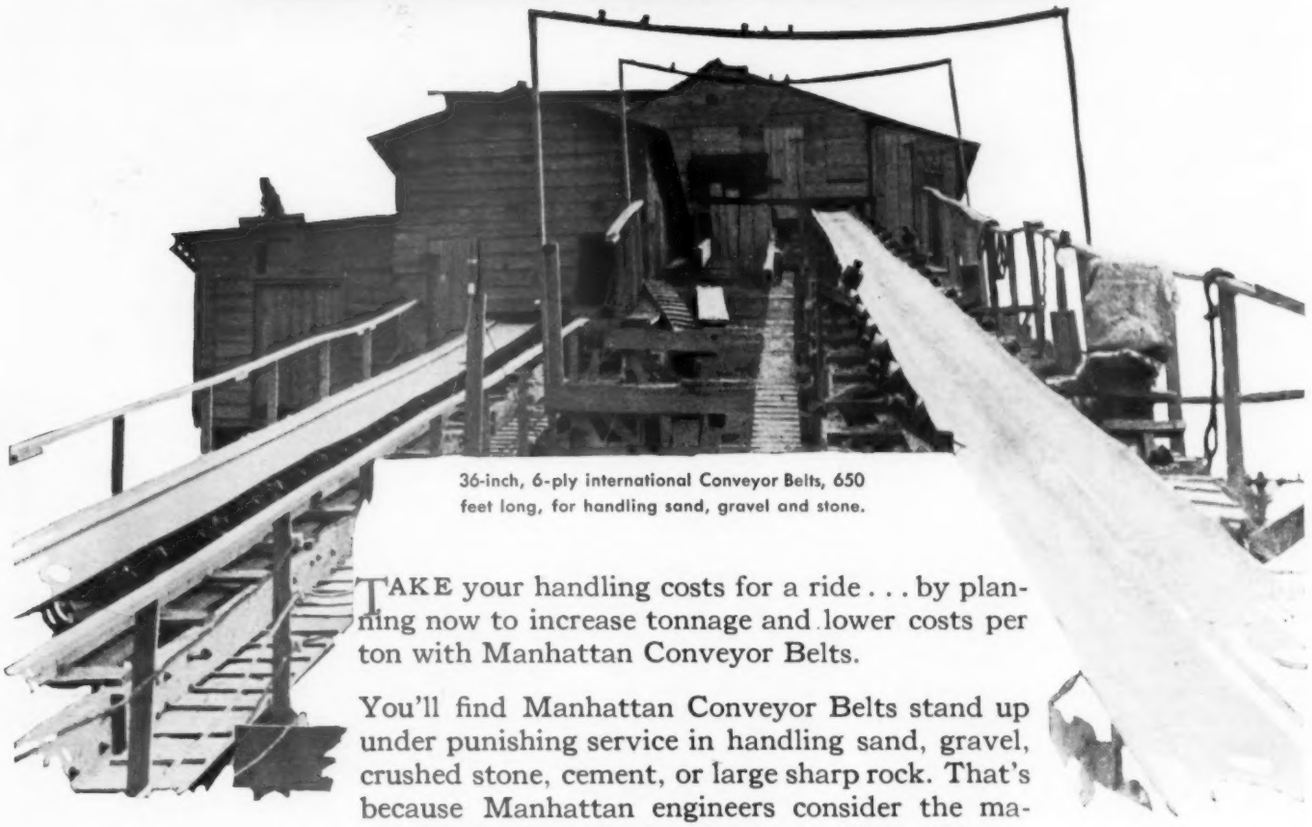
HIGH SPEED MODELS: 15 to 230 H. P., 900 to 1800 R. P. M.

THE NATIONAL SUPPLY COMPANY . . . SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. · SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Calif.; Houston, Texas.

600 TONS PER HOUR AT 600 F. P. M. . . . YEAR AFTER YEAR

MANHATTAN BELTS
Cut Costs



36-inch, 6-ply international Conveyor Belts, 650 feet long, for handling sand, gravel and stone.

TAKE your handling costs for a ride . . . by planning now to increase tonnage and lower costs per ton with Manhattan Conveyor Belts.

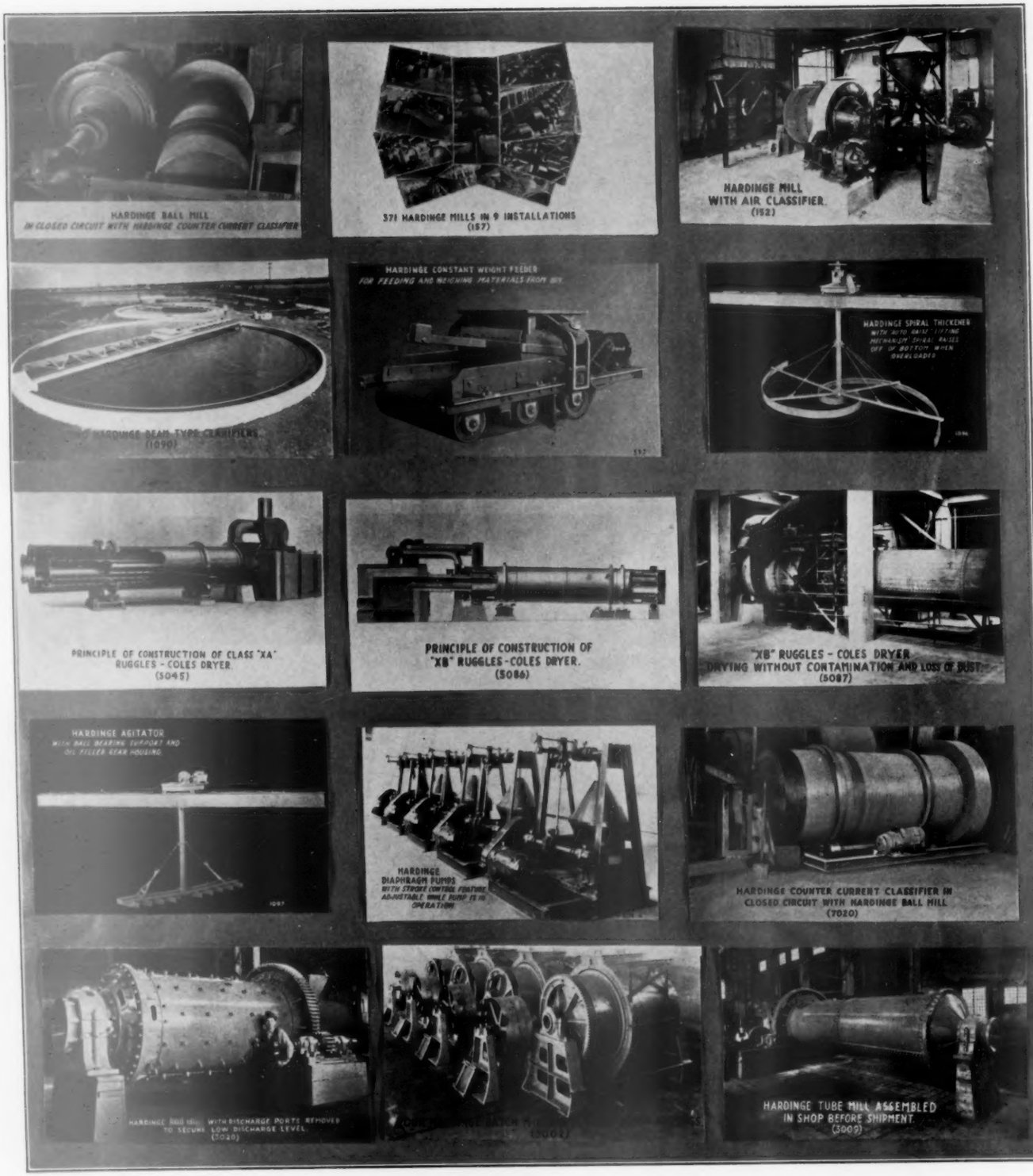
You'll find Manhattan Conveyor Belts stand up under punishing service in handling sand, gravel, crushed stone, cement, or large sharp rock. That's because Manhattan engineers consider the material to be hauled, the distance, and the lift . . . then apply 45 years' research, design, and engineering experience to determine the type and construction of each conveyor belt they build.

Once the busy season starts, you cannot afford to hold up production to nurse worn and troublesome conveyor belts. So replace them now . . . and do it with Manhattan Conveyor Belts.

Condor PRODUCTS

Conveyor Belt	Suction Hose	Launder Lining
Transmission Belt	Fire Hose	Industrial Brake Lining
V-Belt	Hydraulic Hose	Molded Rubber Goods
Air Hose	Steam Hose	Rubber Lined Tanks
Contractors Hose	Water Hose	Rubber Covered Rolls
Sand Blast Hose	Chute Lining	Abrasive Wheels

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES, 18 TOWNSEND ST., PASSAIC, N. J.



HARDINGE

COMPANY, INCORPORATED – YORK, PENNSYLVANIA

New York, 122 East 42nd Street Chicago, 205 West Wacker Drive San Francisco, 501 Howard Street Denver, 817 Seventeenth Street

CONICAL MILLS | COUNTER CURRENT CLASSIFIERS | THICKENERS CLARIFIERS | RUGGLES-COLES DRYERS | CONSTANT WEIGHT FEEDERS | TUBE ROD AND BATCH MILLS

Again MURPHY Steps Out!

ROHL-CONNELLY CO. Los Angeles, Cal.	4
JOHN C. MILES Terre Haute, Ind.	2
H. A. STEPMAN COAL CO. Coalmont, Indiana	2
U. S. ENGINEERS Fort Peck, Mont.	2
WALSH CONSTRUCTION CO Davenport, Iowa	2
LEE WILSON COMPANY Wilson, Ark.	2
ISBELL CONSTRUCTION CO. Reno, Nevada	2
E. J. ALBRECHT Chicago, Ill.	2
D. B. BAYLES Paxton, Illinois	2
BOONVILLE COAL SALES CORP. Boonville, Indiana	2
JOHN W. HARRIS DRILLING CO. Wichita Falls, Tex.	1
JOE HENDRIX Alexandria, La.	1
LONE STAR CONSTR. CO. San Antonio, Tex.	1
FRED MANNIX Calgary, Canada	1
MEXICAN GOVERNMENT Santa Caterina, Michoacan, Mexico	1
THE OHIO OIL COMPANY Houston, Texas	1
J. N. PITTS Winnipeg, Canada	1
ROCK & LIME COMPANY, INC. Baton Rouge, La.	1
SOUTHERN RAILWAY CO Washington, D. C.	1
U. S. ENGINEERS (Mud Mt. Dam site) Seattle, Wash.	1
VIKING DREDGING CO. Redding, Cal.	1
R. J. HASTINGS CO St. Louis, Mo.	1
PIOMBO BROTHERS San Francisco, Cal.	1
GOVERNMENT OF BRAZIL I.F.O.C.S. Dept (S.A.) Fortaleza, Brazil	1
CAPITAL MATERIALS CO Washington, D. C.	1
GEO. W. CONDON COMPANY Omaha, Nebr.	1
GIBTON & FUGATE COAL CO. Brazil, Ind.	1
HARD, UDTILA & HANSON Fairbanks, Alaska	1
LANEY-MARSHALL GIN CO. Osceola, Arkansas	1

MURPHY Diesel Engines in the hands of contractors, in crushing plants, in the oil fields, on cotton gins, in the coal industry and in other fields of service all over the country have proved the dependability and economy of Murphy performance. The fact that many of these concerns after operating Murphys for long periods of time bought a second, third or fourth Murphy Diesel is convincing evidence of the high type of service that is made possible by the unusual Murphy advantages.

Let us send you our new bulletin.

MURPHY DIESEL COMPANY LTD.
5317 W. Burnham St.
Milwaukee Wisconsin

The outstanding Advance in Diesel Engines

-and many more!

Ask for a MURPHY DIESEL

The outstanding Advance in Diesel Engines

LANEY-MARSHALL GIN CO. Osceola, Arkansas	2
GEO. W. CONDON CO. Omaha, Nebraska	2
FORCUM JAMES CO. Dyersburg, Tennessee	2
HORTON & COLEMAN, INC. Memphis, Tennessee	2
S. W. HARDWICK CO. Beardstown, Illinois	2
McGINNES BROS. Houston, Texas	2
MORRISON-KNUDSEN CO. Boise, Idaho	2
BODINSON MANUFACTURING CO. San Francisco, California	2
MORROW & STOUT Greenville, Mississippi	2
BERT CALVERT Los Angeles, California	1
ARCHIE DANISON Pasadena, California	1
FIELD BROS. Lubbock, Texas	1
GRANFIELD, FARRAR & CARLIN San Francisco, California	1
T. L. JAMES & GUILLIAMS BROS. Ruston, Louisiana	1
JOHNSON BROS. Brantford, Ontario, Canada	1
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FRED C. MORGAN COAL CO. Indianapolis, Indiana	1
C. E. ROUNDS Glendale, California	1
G. F. SCHECKLER Stockton, California	1
WILLIAM H. SMITH Alexandria, Louisiana	1
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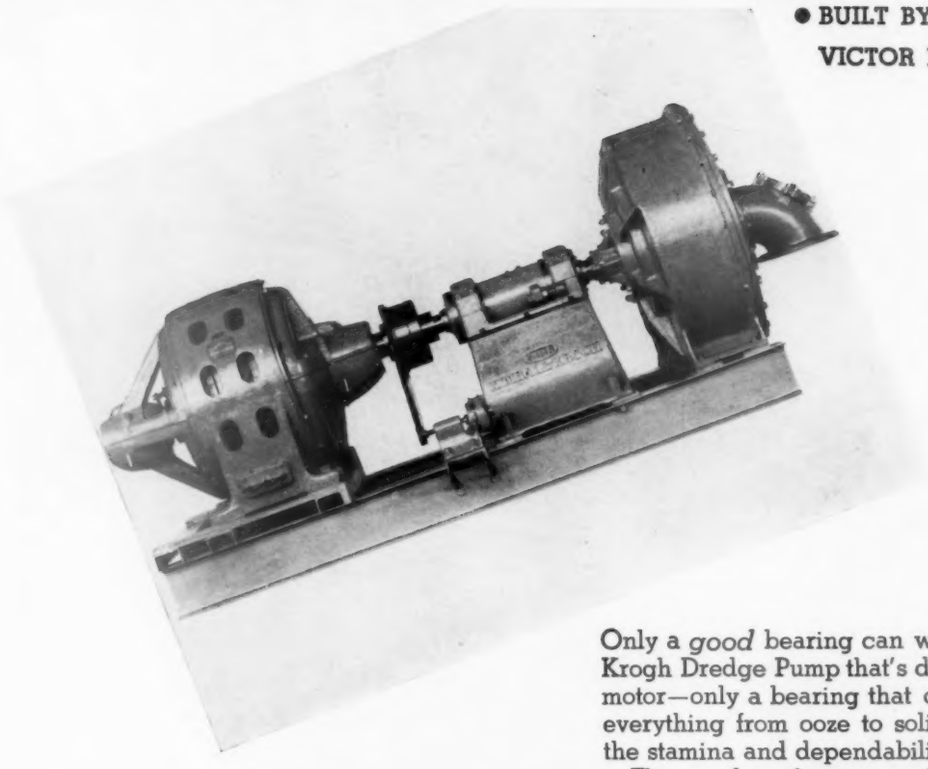
U. S. TREASURY DEPARTMENT Washington, D. C.	1
C. V. VOLLMER Memphis, Tennessee	1
CLEAL T. WATTS Effingham, Illinois	1
CLIFFORD WILSON Texarkana, Texas	1
YUKON MINING CO. Russian Mission, Alaska	1
SMOOT SAND & GRAVEL CO. Washington, D. C.	1

Ask for a MURPHY DIESEL ENGINE on your Equipment!

BANK ON ITS
EFFICIENCY

● BUILT BY
VICTOR EQUIPMENT CO.



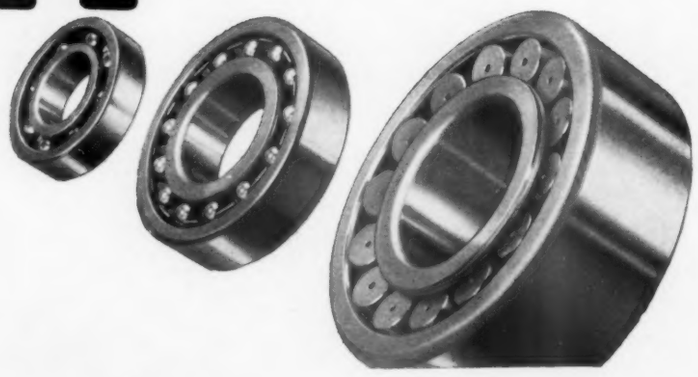
Only a *good* bearing can work on this 12" Victor-Kimball-Krogh Dredge Pump that's direct-connected to a 500 H.P. motor—only a bearing that can stand the gaff of conveying everything from ooze to solid rock—only a bearing that has the stamina and dependability of SKF Bearings.

The good performance of the big pump, with its smaller circulating pump providing clean water to its packing, speaks well for the SKF's on radial and thrust ends of the shaft. It speaks in terms of high efficiency, high capacity, low maintenance and freedom from bearing trouble. All of which proves that SKF puts the right bearing in the right place. 4242

SKF INDUSTRIES, INC., PHILADELPHIA, PENNA.

THE BEARINGS ARE
SKF

BALL & ROLLER BEARINGS



This high-stepping crusher is the center of attraction all down the line, and as the procession advances the first division is constantly being augmented by operators in the stone crushing, sand and gravel, lime and cement manufacturing, chemical and mining industries.

One principal reason for the triumphal march of the Traylor Type TY Reduction Crusher is that it performs spectacularly, yielding profits in greater volume than purchasers expect, which, in the last analysis, is the truest measure of merit of any machine.

Get acquainted with this crusher—share those extra profits at no added cost. See our Bulletin 2112.

TRAYLOR ENGINEERING & MANUFACTURING CO.

ALLENTOWN, PENNSYLVANIA, U. S. A.

NEW YORK CITY — CHICAGO — SALT LAKE CITY — LOS ANGELES — SEATTLE

KOEHRING

LONG REACH HIGH LIFT

High lift and long reach cut excavating costs with Koehring Shovels. . . . The Koehring independent and positive crowding action spots the dipper beyond and above the end of the boom or wherever it may be desired. . . . This 5/8 yard Koehring Shovel is operating in a brick plant where high lift and long reach are essential for maximum production.

KOEHRING COMPANY
CONSTRUCTION EQUIPMENT • MILWAUKEE, WISCONSIN

QUAKER
Conveyor Belting

The Sand, Gravel, Stone, Cement and kindred industries are not satisfied with mere looks in a conveyor belt.

They demand a belt that will stay out in the open month after month, exposed to the weather and the abrasive effects of the material being conveyed . . . and deliver high tonnage economically.

That's why so many plants are specifying QUAKER . . . the belt made with duck impregnated with rubber, giving it a friction that defies separation. The special woven fabric that puts to rout any excessive stretch. The belt that stays on the job avoiding costly shut-downs. Quaker belts have what it takes to stand up and deliver volume tonnage.

On your next conveyor belt specify QUAKER . . . the belt that will give you long service at low cost per ton of material conveyed.

BELTING
HOSE
PACKINGS

If it's a QUAKER Product, it's Guaranteed

Our representative will be on the lookout for you at the Cincinnati Convention.

FOR ECONOMICAL OPERATION, SPECIFY QUAKER RUBBER PRODUCTS

QUAKER CITY RUBBER COMPANY

OVER 50 YEARS OF CONSISTENT QUALITY

PHILADELPHIA · NEW YORK · CHICAGO · SAN FRANCISCO

THE MOST *Economical* ROCK DRILLING TOOL

Mine and quarry operators who have adopted TIMKEN Rock Bits have found them to be the most economical rock drilling tools they have ever used.

Apart from the considerable savings brought about by the removable feature, including the elimination of reforging and the radical reduction of nipping, TIMKEN Bits possess inherent advantages that cut drilling costs to the bone.

They drill faster, because of their scientific design and unique shoulder construction which distributes the drill blows evenly to all cutting edges.

They last longer because they are made of TIMKEN Electric Furnace Steel heat treated and deep hardened by the same methods used in manufacturing TIMKEN Bearings, thus presenting greater resistance to abrasion and wear.

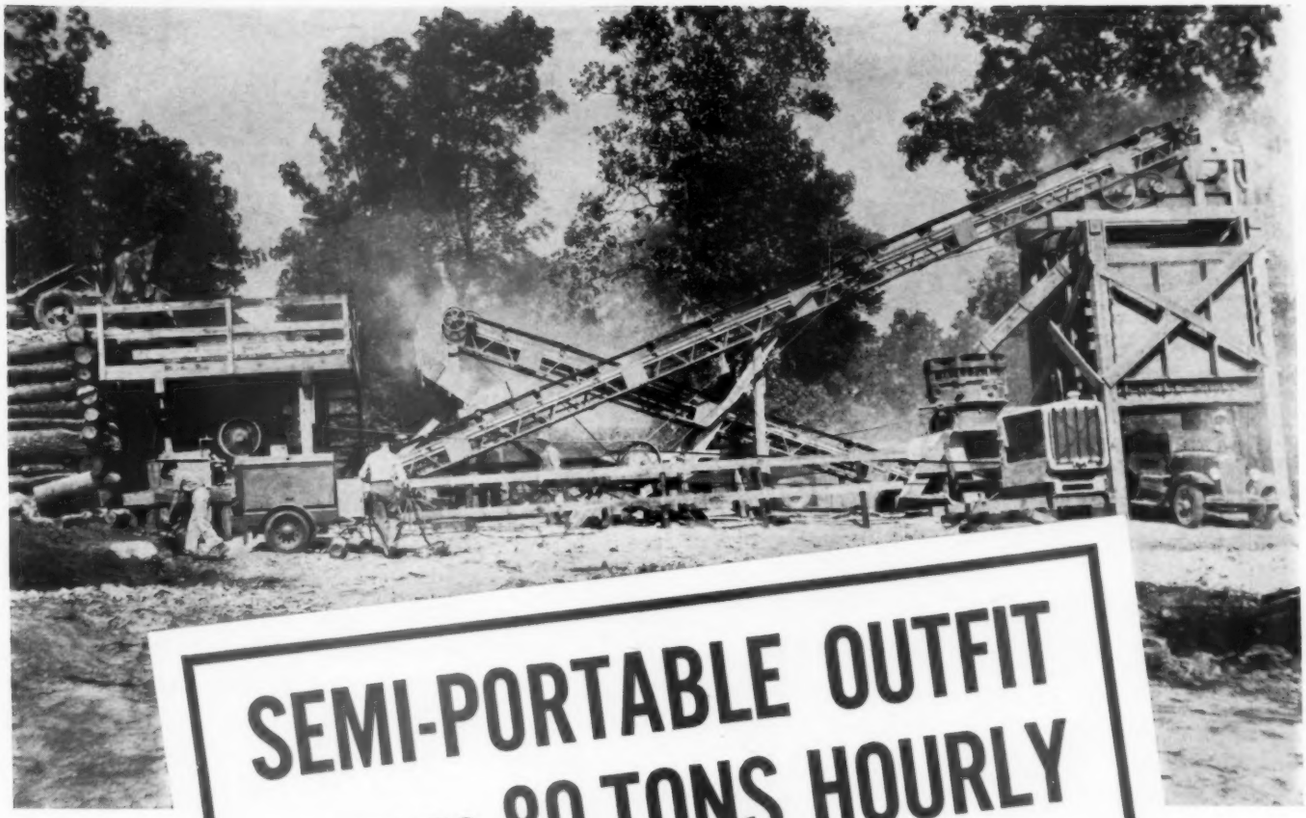
Sooner or later you will see the advisability of adopting removable rock bits. When you do, be sure you get *all* the benefits they afford. You will get them all with TIMKEN Rock Bits. Write for further information.

TIMKEN Bearings are used on all locomotives and many of the cars of the new 20TH CENTURY LIMITED

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; TIMKEN Rock Bits; and TIMKEN Fuel Injection Equipment.

TIMKEN
ROCK BITS



SEMI-PORTABLE OUTFIT CRUSHES 80 TONS HOURLY

Here's a semi-portable quarry plant that "crushes more stone in a ten-hour shift than any other plant in North Carolina," according to Lee G. Smith, who was in charge for the owner, Nello Teer of Durham, N. C.

The plant has just finished crushing 40,000 tons of minus 1½-in. rock for a new road on Route 152, North Carolina, for the State Highway and Public Works Construction. The rock there is a very hard granite, but this sweet-running Telsmith Crushing Plant kept right on turning out its 800 tons of minus 1½-in. every ten-hour shift.

So smoothly has it operated that not once was there a mechanical failure, and no productive time was lost during the entire job. Typical Telsmith performance!

The new road extends 9½ miles between China Grove and Rockwell, small towns near Salisbury, N. C.; and is 30 ft. wide at the fills and 35 ft. wide in the cuts. All of the rock had to be minus 1½-in., with about 35 per cent minus ¼-in. material. The engineer for the state was G. H. Ehringer.

The rock was hand-loaded into skip pans. Thirteen trucks, each hauling four tons a trip, brought the skip pans to the coarse crusher, a No. 13-B Telsmith Gyratory Crusher. After crushing, a 24-in. x 68-ft. latticed steel frame Telsmith Portable Belt Elevator carried material direct to a 4-ft. x 10-ft. Telsmith Triple Deck Pulsator.

Oversize from this vibrating screen was chuted to the secondary crusher, a No. 36 Telsmith Gyrasphere Crusher; and a 24-in. x 38-ft. Telsmith Portable Conveyor took the re-crushed material back to the main conveyor for re-screening. A 95 hp. Diesel engine drove the entire plant. Six men took care of all maintenance and operation, including feeding the primary crusher and loading trucks from the bin.

Telsmith builds rock crushing and gravel washing plants of all sizes and types—portable, semi-portable and stationary—designed to fit your conditions and equipped for faster production, lower upkeep and more profitable operation. You'll want details... Write for *free Bulletin* Q-15.

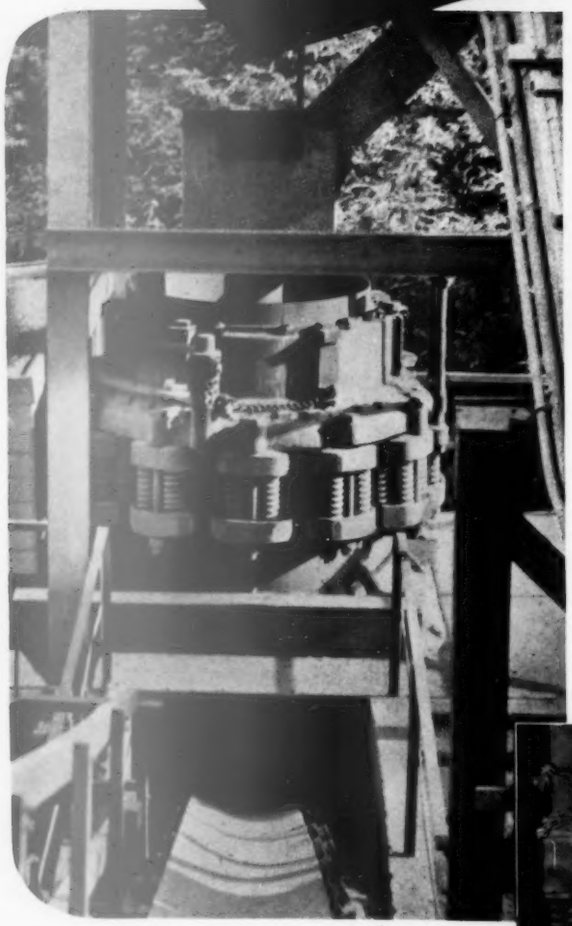
SMITH ENGINEERING WORKS
504 EAST CAPITOL DRIVE, MILWAUKEE, WISCONSIN
Cable Addresses: Sengworks, Milwaukee — Concrete, London
Associates in Canada: Canadian Vickers, Limited, Montreal, Vancouver

50 Church Street, New York City
211 W. Wacker Drive, Chicago, Ill.
713 Commercial Trust Bldg., Philadelphia, Pa.
81 Binney Street, Cambridge, Mass.
412 Westinghouse Bldg., Pittsburgh, Pa.
Brandeis M. & S. Co., Louisville, Ky.

QC-3-39

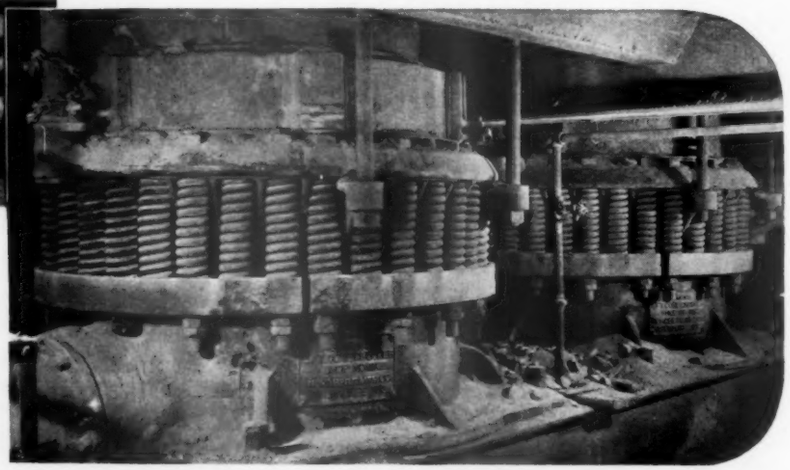
TELSMITH

SYMONS SHORT HEAD CONE—now supplies that finer sized stone



A four-foot Short Head Cone makes the minus ¾ inch material.

Here is another instance where a Symons Short Head Cone has been added to meet the changing demand for finer crushed material. The two Standard Cones were originally installed to take a 2 to 4 inch feed and make all the finer sizes then required. With an increased use of more material ranging in sizes from minus ¼ inch to minus ¾ inch, the Standard Cones are now only making the ¾ to 1½ inch sizes, while the Short Head Cone is taking the discharge from the Standards and supplying the finer products. The Short Head Cone is arranged to operate independently of the main plant, taking the surplus of any size in storage and readily producing any of the finer sizes for which there is a ready market. This combination of Symons Standard and Short Head Cones permits of greater flexibility and economy of operation and a lower crushing cost, and is the answer to meeting present day demands for the finer sizes of crushed materials.



Two four-foot Standard Cones do the ordinary reduction crushing.

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

NEW YORK CITY, 60 E. 42nd St. • LOS ANGELES, Subway Terminal Bldg. • TORONTO, Concourse Bldg. • LONDON, Bush House

LOOK INSIDE

FOR THE WORTH OF REPUBLIC BELTING AND HOSE

ORDER REPUBLIC PRODUCTS FROM YOUR DISTRIBUTOR

What we know as rubber belting and hose are, of course, combinations of various reenforcing materials with rubber compounds. Since these other elements are necessary in the mechanical application of rubber—too much importance cannot be placed on the way they are combined. . . . . .

Extensive laboratory and experimental facilities are constantly utilized in developing specifications and better means of uniting the component parts of Republic Belting and Hose. You have only to examine the inner design of a product to detect Republic's advancement in built-in quality—you will find duck construction of belting designed to eliminate internal chafing . . . strong and resilient cord construction in pneumatic hose for resistance to unusual shock and abuse . . . tenacious rubber compounds for wear and tear. These and similar refinements in the structure of Republic Products are evidence of experience and skill in the manufacture of Mechanical Rubber Goods. . . . . .

The next time your plant requires belting or hose replacements, look into the merits of a Republic Brand. Discover for yourself the features of design and quality which mean additional service. Profit from what you find. Specify Republic. Republic Rubber Division of Lee Rubber and Tire Corporation, Youngstown, Ohio . .

REPUBLIC RUBBER

HOSE · BELTING · PACKING · MOLDED PRODUCTS

DRAGLINES *and* TRUCKS HAVE TO HUMP!

because it's a UNIVERSAL

This compact gravel plant for straight line operation is making money for its owner, an Iowa operator. It crushes, screens and loads; material passing through in a smooth, steady stream, keeping the dragline and the operator's trucks on the go all the time.

And Universals do it at the lowest operating cost and with a minimum of repairs, allowing their owners to operate at a profit on every job as Universal Crushers and Crushing Plants always do—because they've got the "guts" to stand up and grind it out even under the most constant use and even the most hard-to-crush materials.

Why can Universals crush greater capacities, faster, more uniformly and at a lower cost? Superior design, improved construction, longer lasting materials that result from a third of a century of engineering experience.

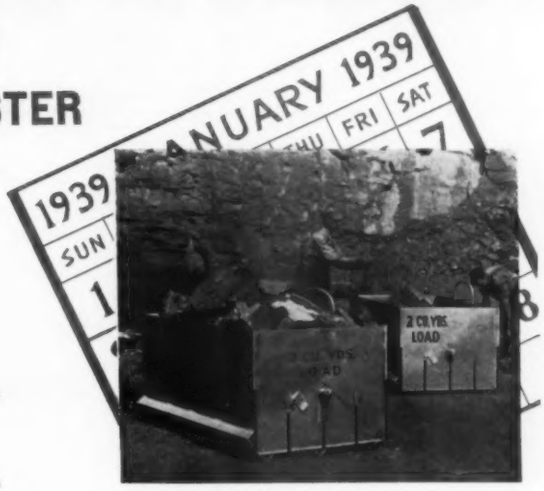
Universal has built crushing equipment exclusively since 1906. Over 50 combinations of Portable, Semi-Portable and Stationary Crushing, Screening, Loading and Washing Plants are available today—each the most profitable and productive of its type in the field. You can bank on a Universal! Write for new literature.

UNIVERSAL CRUSHER COMPANY 619 C Avenue West CEDAR RAPIDS, IOWA

UNIVERSAL

TIME TAKES A HOLIDAY

when the Model "LF" DEMPSTER - DUMPSTER is on the Job



LOADING—At shovel level

HOISTING and HAULING

DUMPING—One man control

TIME SAVING EQUIPMENT will be the answer to cost problems in 1939.

Concho Sand & Gravel Co., Inc., of Oklahoma City, Okla., has just installed three of our new "LOAD FORWARD" DEMPSTER-DUMPSTERS of 2 cu. yd. capacity. The Campbell Limestone Company of Gaffney, S. C., recently placed order for their eighth unit. This is 2 cu. yds. capacity also. What these successful operators are doing is also being done by other operators in all sections of the U. S. The answer is—Economy Production.

In quarry operations, road building work and construction projects where hand loading is a factor, the DEMPSTER-DUMPSTER method has shown reductions as much as 30% to 50% as compared to the old way.

With Model "LF" DEMPSTER-DUMPSTER unit mounted on a 1½-ton truck, it is easy to handle 2 cu. yd. containers, fully loaded, and travel at top speed.

One-Man Control with automatic hoist and dump, the truck can handle from four to ten detachable buckets in relays—and run up a big record for yardage every day.

Government Engineers and Private Contractors are using whole fleets of DEMPSTER-DUMPSTERS on their big jobs—and reporting sensational economies. On the Conchas Dam project in New Mexico, government engineers are employing twenty trucks equipped with DEMPSTER-DUMPSTERS and hauling 2 cu. yd. each of riprap stone from quarry to earthfill dam.

Write for Bulletin of this modern time-saving equipment.

DEMPSTER BROTHERS, INC. KNOXVILLE, TENNESSEE

These views show the new Model "LF" in action—No Overhang—No counterweight—No Sidesway.

Washington New York Boston Nashville Chicago

BOOKS FOR YOUR LIBRARY

USE THIS CONVENIENT COUPON

Pit and Quarry Handbook (including the Directory of Cement, Gypsum, Lime, Sand, Gravel and Crushed-Stone Plants). 1938 ed., 792 pages, 8½ x 11½, 447 ill., 39 charts, 94 tables, cloth. Complete, concise and conveniently arranged technical reference work on all phases of designing, operating and maintaining nonmetallic-mineral producing and manufacturing plants (cement, lime, gypsum, sand-and-gravel, crushed-stone, aggregates-bituminizing and ready-mixed-concrete). Accepted the world over as the standard authority.

Pit and Quarry Directory. (The Directory Section of the Handbook, published separately). Complete alphabetical and geographical lists of nonmetallic-mineral producing and manufacturing companies and their plants. 1938 ed., 254 pages, 8½ x 11½, paper.

Materials Handling Equipment. By Edward J. Tournier, estimating engineer, Robins Conveying Belt Co. 371 pages, 6x9; 146 ill. Sets forth the results in service of those mechanical-handling devices generally used and indicates the methods by which a proper selection may be effected. An invaluable guide to economical equipment purchasing.

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AMERICAN for GREATER TONNAGE at LOWER COST

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With justifiable pride we are "crowing" to the world that during 1938 we placed more machines in service than in any other year of our 25 years of building superior excavating equipment. This record following the big year of 1937 indicates a very definite trend.

A trend that shows the swing is to BAY CITY for convertible shovels in capacities ranging from ⅜ to 1¼ yards. More and more of these dependable machines are going into service—there is one near you giving outstanding performance and making real money for its owner. If you want big yardage at low cost, let us show you one of these fast-working, powerful, easy-to-operate machines.

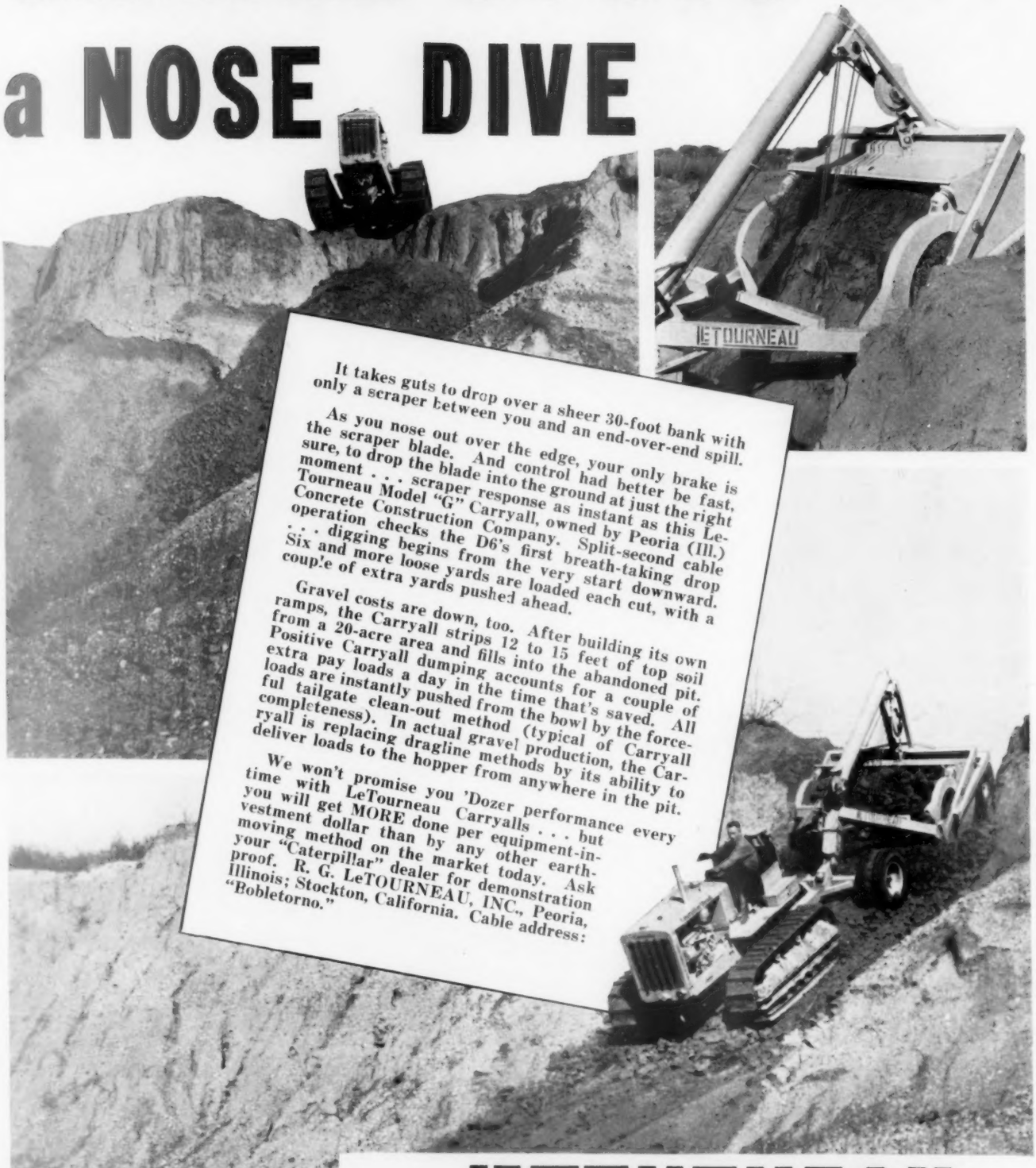
Or, write for new general Catalog H-3 giving complete description and specifications.

BAY CITY SHOVELS, Inc., Bay City, Michigan

Export Office: H. M. Hein, 330 W. 42nd St., New York (Oparo)

BAY CITY SHOVELS

GRAVEL COSTS take a NOSE DIVE



It takes guts to drop over a sheer 30-foot bank with only a scraper between you and an end-over-end spill.

As you nose out over the edge, your only brake is the scraper blade. And control had better be fast, sure, to drop the blade into the ground at just the right moment . . . scraper response as instant as this LeTourneau Model "G" Carryall, owned by Peoria (Ill.) Concrete Construction Company. Split-second cable operation checks the D6's first breath-taking drop . . . digging begins from the very start downward. Six and more loose yards are loaded each cut, with a coup'e of extra yards pushed ahead.

Gravel costs are down, too. After building its own ramps, the Carryall strips 12 to 15 feet of top soil from a 20-acre area and fills into the abandoned pit. Positive Carryall dumping accounts for a couple of extra pay loads a day in the time that's saved. All loads are instantly pushed from the bowl by the forceful tailgate clean-out method (typical of Carryall completeness). In actual gravel production, the Carryall is replacing dragline methods by its ability to deliver loads to the hopper from anywhere in the pit.

We won't promise you 'Dozer performance every time with LeTourneau Carryalls . . . but you will get MORE done per equipment-investment dollar than by any other earth-moving method on the market today. Ask your "Caterpillar" dealer for demonstration proof. R. G. LeTOURNEAU, INC., Peoria, Illinois; Stockton, California. Cable address: "Bobletorno."

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Angledozers,* Buggies,* Bulldozers, Carryall* Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters,* Treedozers, Sheep's Foot Rollers. *Name reg. U.S. Pat. Of.

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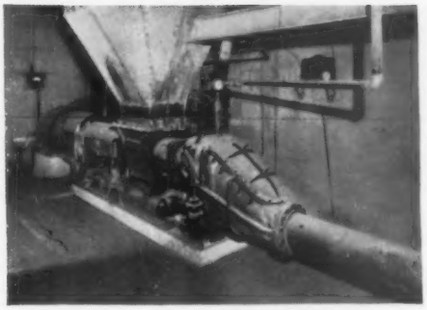
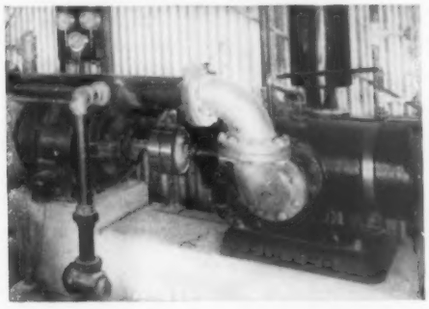


Fuller-Kinyon Pump, stationary



Fuller Rotary Compressor, Single stage

Fuller Remote-Control Unloader, unloading cement from barge

THE Fuller Company has been identified with the problems of conveying and equipment for that purpose for many years. A number of its engineers have had the advantages of designing, engineering, erecting and servicing Fuller equipment covering a span of well over twenty five years; also engineering knowledge and data passed on to them by their predecessors. The experience accumulated from contacts with many installations has led to the development of equipment peculiar to the chemical process industry. Some of this equipment is illustrated on this page.

The possibilities of savings warrants your thorough investigation of the following equipment:

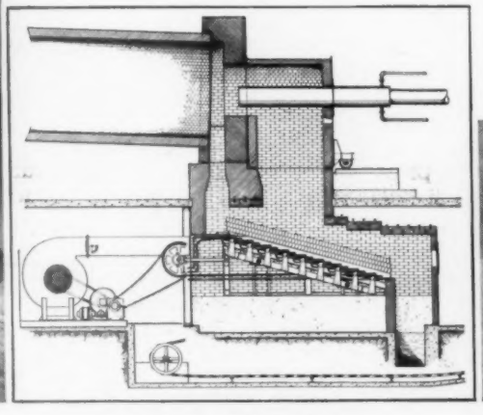
Fuller-Kinyon Conveying Systems, stationary and portable—for conveying dry pulverized materials. Capacities one to 300 tons an hour. Conveys cement as far as 3600 ft. and to elevation of 300 feet.

Fuller-Kinyon Remote-Control Unloader—for conveying dry pulverized materials from flat-bottom bins, underneath silos, cars, ships and barges.

Fuller Rotary Compressors and Vacuum Pumps, Single and Two-stage types. Capacities to 1800 c.f.m. actual free air delivery, pressures to 125-lb. gage. Vacuums to 99 percent of barometer.

Fuller Inclined-Grate Cooler—Rapid air quenching for the production of clinker of high glass content; substantial economies in fuel consumption; unique mechanical simplicity and ease of accessibility; low maintenance costs and remarkably low power to operate. Two-stage cooling under independent control provides for maximum flexibility in heat recovery and cooling.

Fuller Rotary Feeder—for delivering raw materials, pulverized coal, cement, lime, etc. with consistent volumetric accuracy. Available in sizes to meet all normal plant requirements.



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LUBRICATION . . . . . .

Spiral pump oiling systems automatically lubricate the roller journals and the main shaft. The surest lubrication ever built into a mill.

MOTOR . . .

Mill and fan driven by one constant-speed direct-connected standard motor—no belts, no idlers, no spe ial motor shaft.

FAN . . .

Operates on suction side of mill, handling constant temperature air and giving a uniform, intimate air-coal mixture for maximum combustion efficiency.

IF THIS ○ ROLLS OVER THIS □ EASIER

THAN THIS ○ ROLLS OVER THIS □ THEN IT IS OBVIOUS

that the larger diameter grinding elements of the Bowl Mill require LESS POWER

Increased kiln production and improved quality of cement clinker at a reduced cost per barrel—these are the direct results of Bowl Mill firing. Due to the efficient pulverizing and classifying principle, uniform fineness is maintained at any rate of feed. The fineness is controlled within close limits at all times.

Thermostatic control of ingoing air is standard equipment on Raymond Bowl Mills. The outgoing temperature of the air-coal mixture is held constant regardless of the moisture content of the coal feed—result: uniform drying, efficient burning and better kiln performance.

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RAYMOND Bowl Mills challenge comparison on low operating costs—low power consumption—and low maintenance, based upon actual operating performance in recent direct-firing installations on rotary kilns.

When operating in the same plant with competitive grinding units and serving the same size kilns, the Bowl Mill shows as much as 30% savings in power.

Bowl Mill firing in a number of installations has reduced coal preparation costs as much as 40 per cent. Economies in fuel, power, labor and repairs, in terms of dollars and cents, have usually paid for the installation in less than one and one-third years.

It didn't just happen that over 250 Bowl Mills were installed in the first three years. It was because pioneer plants, modernizing their coal systems with these mills, found their coal preparation costs reduced so far beyond expectations that they passed the good word on.

ALL ADJUSTMENTS for fineness, roll alignment, air-coal ratio, temperature control—and oiling—are made from the outside while the mill is operating.

REVOLVING BOWL

By this exclusive Bowl Mill feature, the coal is instantly thrown between the rolls and the grinding ring by centrifugal force, giving maximum grinding efficiency with a minimum load of unground material.

THE COIN TEST . . .

Believe it or not—a coin on edge will remain standing upright on the top plate of the Bowl Mill while in operation—which shows—

SMOOTH, QUIET, VIBRATIONLESS OPERATION . . .

The absence of metal-to-metal contact in grinding—balanced design—precision construction—ball and roller bearings—are reasons why the Bowl Mill is the *quietest coal pulverizer* on the market. No special foundation or cushioning pads.

WORM GEAR DRIVE . . .

Precision-built drive mechanism with gears running in a bath of oil. This assures sustained drive efficiency year in and year out.

AUTOMATIC TRAMP IRON DISPOSAL

Tramp iron, slate and pyrites are thrown out of the bowl and discharged automatically from the mill with no attention from the operator—an exclusive Bowl Mill feature.

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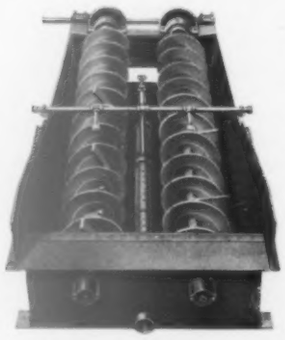
EAGLE "SWINTEK" NOZZLE LADDER
DESCENDING COSTS

Eagle "Swintek" Nozzle Ladder
The nozzle head is manufactured only under Eagle patents. It has no equal.
Write for Catalog



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EAGLE SWINTEK LADDERS will boost production to a new high level—and make operating and maintenance costs skid to rock bottom.

One firm writes: "We have operated a 12-inch 65-foot Swintek Ladder for four years and are well pleased with it. We recommend this equipment for any pump job that has a deposit which will not cave. Our repairs are very small."

You can depend upon an Eagle Swintek Ladder to go over every dredging hurdle and eliminate pumping delays common to plain suction equipment. The digging chain screens the nozzle and loosens refractory deposits with cutters.

Oversize is deposited beyond the working zone, assuring a continuous flow of solid material through the pipe line. Use Eagle Swintek Ladders to increase your pumping capacity 50% to 400%—and cut time, labor and power losses to a minimum.

EAGLE WASHERS, pioneered by Eagle Iron Works and developed through years of building and installation experience, are highly efficient for washing all types of aggregates. Many exclusive and patented features make Eagle Washers the "best bet" where rigid specifications require dependable equipment. Eagle Sand and Gravel Washers are available in Single Screw or Twin Screw Types, in various diameter screws.

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MODERN POWER *in the plant—*
but the HIGH COST of STEAM in the pit

WHY is it that so many quarry and gravel plant operators have taken care to install the most modern power possible in the plant but continue to burn up money in an ancient shovel in the pit?

Because a machine doesn't owe you anything on the original investment doesn't necessarily mean it earns as much money as a modern unit. If you are operating a steamer, check up on it for yourself. What does it cost you to haul coal and water? What's the expense of a watchman, drawing fires, blowing down, boiler replacement, grate bars? What are the costs of delays that come with keeping antiques in repair—and while you're figuring that remember there is no operating expense after you shut down a gasoline, Diesel or electric powered Northwest.

And a Northwest brings you far more than savings over steam. A Northwest is equipped with the "feather-touch" control, the Cushion Clutch. Northwest Shovels are rock shovels—with fast filling, quick dumping dippers—a powerful Independent Crowd and additional crowding force that other shovels waste, the *Northwest* Welded Boom (no Northwest Welded Boom has ever failed). These are things that mean additional profits that will pay for a better machine in your pit. Ask for details about them. No obligation of course.

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GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

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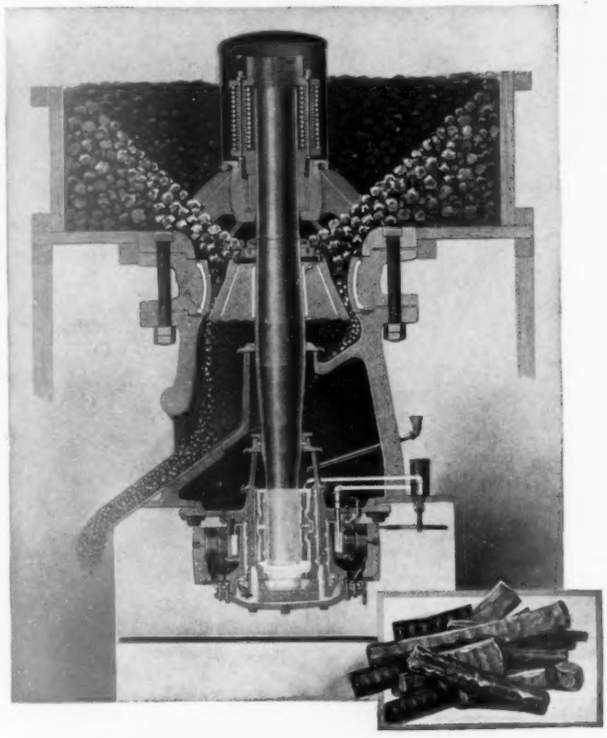
Compare the Results . . . . of an actual test.



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Here are the results:

#37 KENNEDY CRUSHER ..... **85** TONS PER HOUR

Driven by a **50** HP Synchronous Motor

4′ Cone Crusher (*Size larger than the KENNEDY*) ..... **72** TONS PER HOUR

Driven by a **100** HP Motor

Both machines were crushing Dolomite Rock. The KENNEDY was set to 3/16 inch and the cone was set to 5/16 inch.

THIS IS A SAMPLE OF HOW THE KENNEDY CRUSHER WILL INCREASE YOUR CAPACITY AND LOWER YOUR COSTS.

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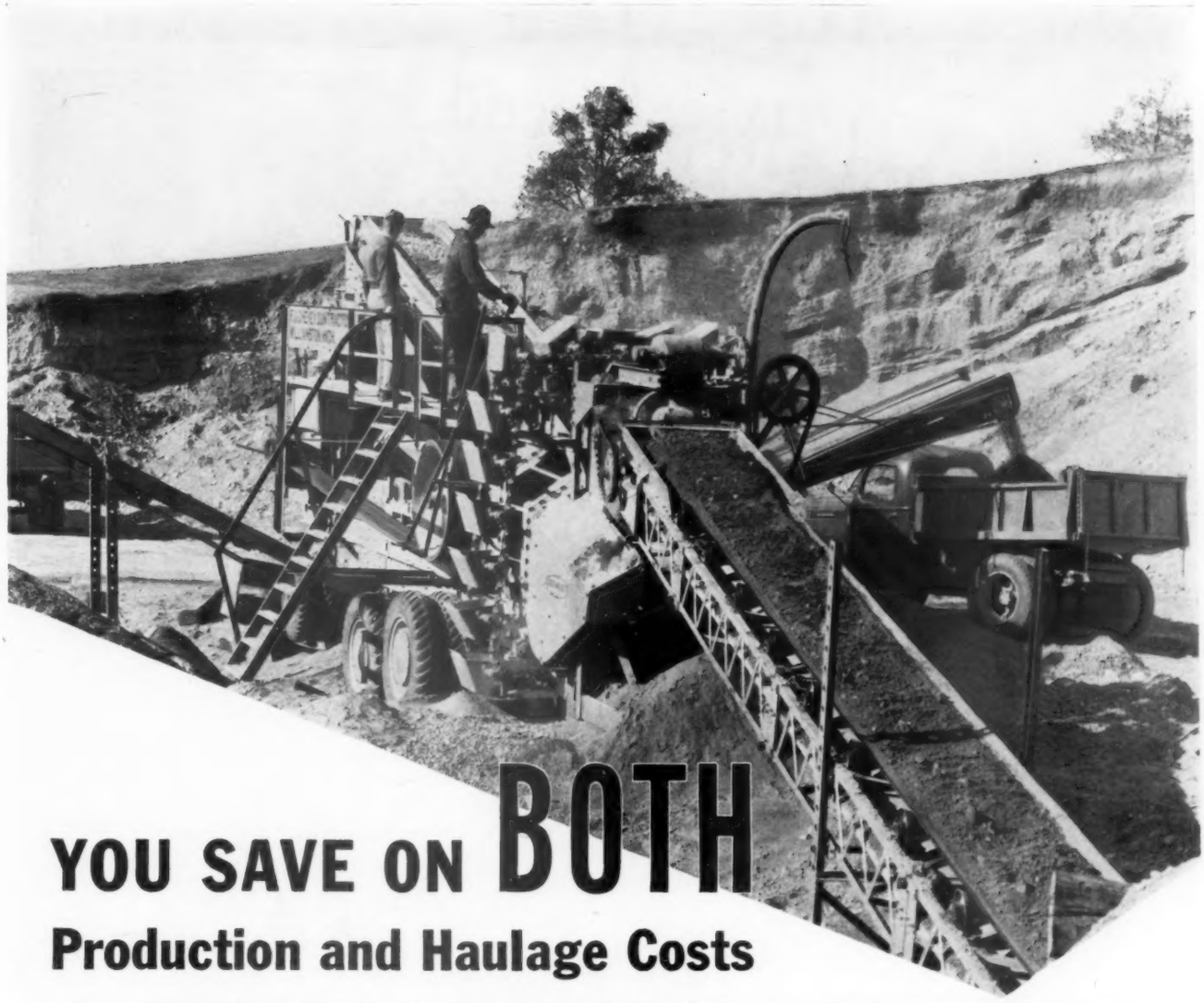

YOU SAVE ON BOTH

Production and Haulage Costs

★ *with A-W Portable Crushing Plants*

Elimination of haulage is only one of the reasons why A-W Crushers deliver crushed stone and gravel at lowest cost per ton. Says Glen D. Kistler, President, Monmouth Stone Company, Monmouth, Illinois:

> "Our total power cost is about 8c per ton. Total production cost, including interest, depreciation, depletion and overhead (including office expense) is about 74c per ton. With our former set-up, production costs averaged about $1.05 per ton."

The experience of Monmouth Stone Company should be of especial interest to any producer. It shows that, under identical conditions, the modern, high-output A-W portable unit provided a saving of more than 25% over the equipment formerly used. Such a production record is no exception to the rule. It is made possible by deep, powerful jaws, operating at highest possible speed; oversize crusher shafts and roller bearings that insure freedom from breakdowns, increase capacity and reduce power cost. Write for full details and further proof of money-saving performance under all operating conditions.

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ROAD MACHINERY CO., AURORA, ILL.

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Here's a piece of Primacord, ready to go to work. It is merely tied into a cartridge—no primer is needed because Primacord-Bickford is a *detonating* fuse.

After the cartridge has been lowered to the bottom of the hole, and the hole loaded and tamped, the Primacord will be tied with a tight half hitch to the main line. The entire blast, which may consist of any number of holes, can then be detonated from a single cap on the main line.

Primacord-Bickford has a core of PETN within a waterproof textile covering. It is furnished in three grades: Plain, Reinforced (*illustrated), and Wire Bound. It is insensitive, light in weight, flexible, strong. And its use in modern blasting leads to many savings in money, time and labor. Send for a copy of the Primacord Book.

THE ENSIGN-BICKFORD CO., SIMSBURY, CONN., U. S. A.
Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse Since 1836

PRIMACORD·BICKFORD *Detonating Fuse*

PB4

The sow's ear

AND THE V·8 ENGINE

THE proverb says that you can't make a silk purse from a sow's ear. The quality just isn't there. It's the same with trucks. No truck can turn in a record for reliable, economical service without *basic quality*.

We don't point to the Ford V-type 8-cylinder engine as the chief advantage of Ford Trucks. It's only a symbol of the extra value that a Ford gives you. The full torque-tube drive, the 47 different kinds of steel, the extremely fine tolerances to which vital parts are held—any of these points of quality or a dozen others will convince you that Ford Truck construction is *quality* construction.

The Ford Motor Company is in the truck manufacturing business—and has been for twenty-one years. A point-by-point examination of a 1939 Ford V-8 Truck or Commercial Car will convince you that there is no unit in the world of comparable size and price that is better designed and better built to serve you.

CHECK YOUR TRUCK AGAINST THESE QUALITY FORD FEATURES!

★ **V-8 ENGINES—95, 85, 60 HP.**— Smooth, dependable low-cost power. Quality materials and precision workmanship for efficient operation and long life.

★ **SEMI-CENTRIFUGAL CLUTCHES**— Non-tiring pedal action. Centrifugal force provides tremendous power-transmitting capacity. Up-keep costs kept at a minimum.

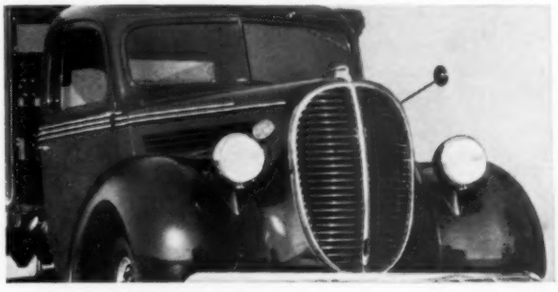
★ **STURDY, TROUBLE-FREE TRANSMISSIONS** — Large roller and ball bearings for all forward speeds reduce friction, save power. Oil-hardened chromium-steel gears for long service.

★ **FULL TORQUE-TUBE DRIVE**— Springs relieved of driving and braking stresses provide better cushioning of truck and its load. Shackle-bolt wear reduced, spring life prolonged.

★ **RUGGED REAR AXLES**— Driving pinion is straddle-mounted to maintain gear-tooth alignment. All truck axles are full-floating, with weight carried on axle housing — none on axle shafts. These features increase dependability and long service, reduce up-keep expense.

★ **BIG, POWERFUL HYDRAULIC BRAKES**— Equalized braking action for straight stops. Big brake-drum diameters and large lining areas for long brake life and low-cost maintenance.

In every detail, the quality of all Ford bodies matches the high quality of Ford chassis. Their exceptional durability means long service with low up-keep cost.



FORD V·8 TRUCKS *and Commercial Cars*

FORD MOTOR COMPANY NOW OFFERS FORD V-8 CARS AND TRUCKS, MERCURY, LINCOLN-ZEPHYR AND LINCOLN MOTOR CARS

1927
1929
1936
1937
1938
ONE LORAIN Sells Another
FOLEY & BEARDSLEE INSTALL 9 LORAINS OVER 12-YEAR PERIOD
● Back in 1927 Foley & Beardslee of Clarkston, Mich., installed their first Lorain—a 1¼-yd. "75" shovel. During the following 12 years, this successful sand and gravel producer purchased eight more Lorains. Five of these machines are illustrated, including the original "75" which is still crowdin' and swingin' with the best of them.
Service—not sentiment—sold these machines. Years of efficient operation and low-cost maintenance were the factors that prompted this owner to purchase Lorains again and again. Lorains attain a higher degree of efficiency and keep it over a longer period of time because they are built to Center Drive design. It is this feature which permits a more direct transmission of power and makes for greater strength through simplified construction.
Every unit in the Lorain line of ⅜ to 2½-yd. shovels and cranes offers you all of these advantages because all are built to Center Drive design. That's why Lorain owners come back for more. Write today for catalogs and performance data.
THE THEW SHOVEL CO. • LORAIN, OHIO
THEW CENTER DRIVE
LORAINS
3/8 TO 2 1/2 CU. YD.

Dragline dredging the Meremac River for sand and gravel, a gasoline engine and a Cummins Dependable Diesel owned by the Worthington Material Company are working side by side.

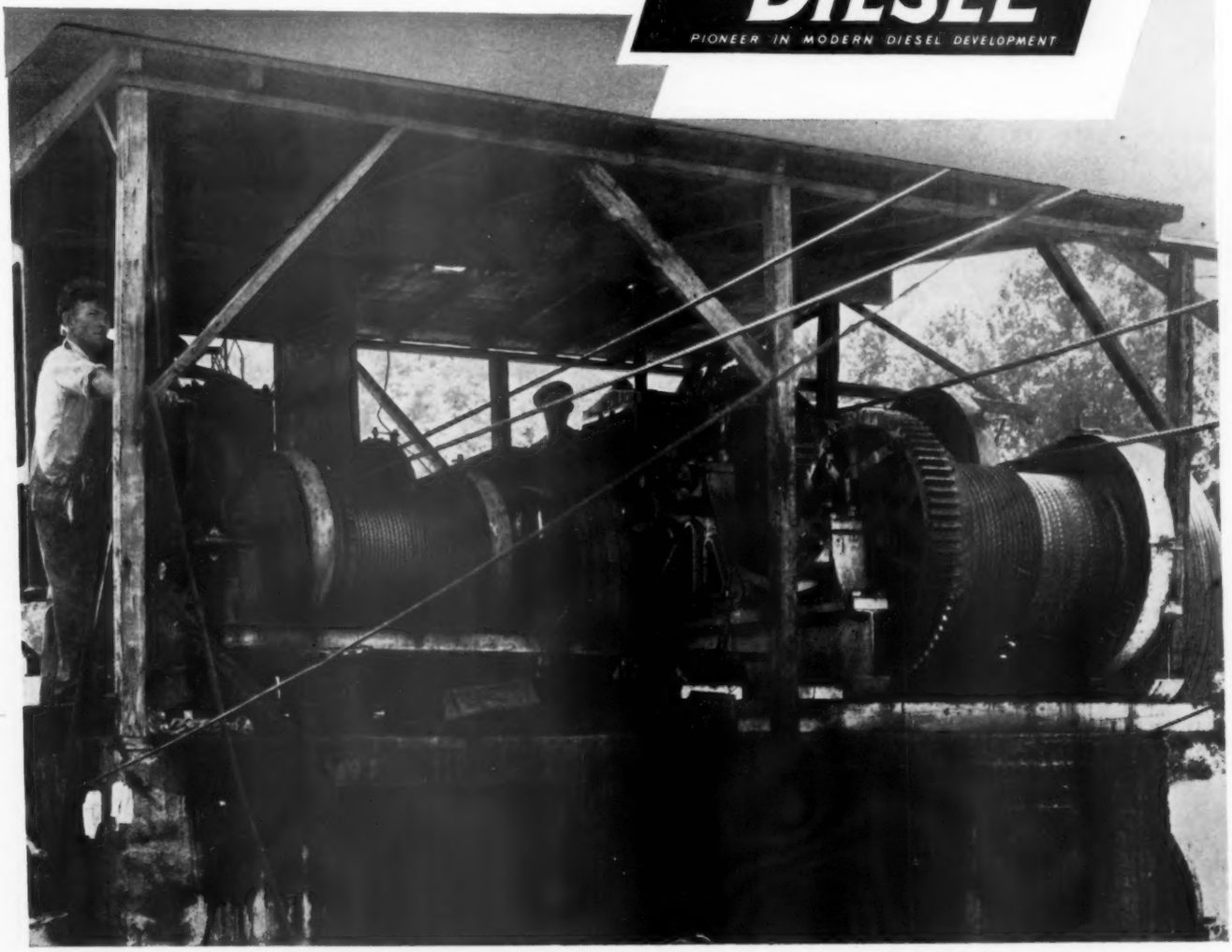
Both engines have the same bore and stroke . . . but the extra power in the Cummins Diesel pulls a 2½-yard bucket across the river faster than the gas engine pulls its 1½-yard bucket . . . and the Cummins Diesel burns just half as many gallons of low-cost fuel doing it.

Here is real "Job-Test Evidence" of more work done cheaper . . . another typical example of the extra profit you could earn with Cummins Diesel power. Cummins Engine Co., 3615 Wilson Street, Columbus, Indiana.

40 years of experience in the construction and supply fields is behind Mr. E. M. Worthington, president of the Worthington Material Company, St. Louis, who says, "Considering power, economy, and flexibility, Cummins Diesel power is the most satisfactory and efficient I have ever used." It is said that in the last three years Worthington Material Company has processed more than one-third of all the sand and gravel used in St. Louis.

Profit follows the Cummins Diesel

CUMMINS
Dependable
DIESEL
PIONEER IN MODERN DIESEL DEVELOPMENT



Readers and Advertisers Alike Prefer PIT AND QUARRY

For nearly a decade Pit and Quarry has led the field in subscriptions among producers. Its popularity has grown constantly, its margin of lead increased steadily, not by any sudden bound due to special offers or inducements. Its volume of advertising in 1938 was definitely larger than that of any other paper in the field.

The reason? At no time has Pit and Quarry compromised with its high editorial standards. It has held its editorial staff, and kept its field editor on the road, wearing out a car in one to two years. The illustrations have always been plentiful, the articles easy to read.

Costly to do this? Yes, it is. But it has been worth the cost, for producers realize that Pit and Quarry has worked with them. And the high percentage of subscribers who renew their subscription attests their loyalty to a publication understanding their problems and working with them.

The subscription price is still only one dollar for a full year's service. If you are not already a subscriber, why not send in a dollar and learn why other producers find Pit and Quarry so valuable? The cost is small—the results so large—don't delay.

Return This Coupon To-day—Start Your Subscription with the January issue

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PIT AND QUARRY PUBLICATIONS,
538 So. Clark Street, Chicago, Illinois.

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My Name..... Title.....

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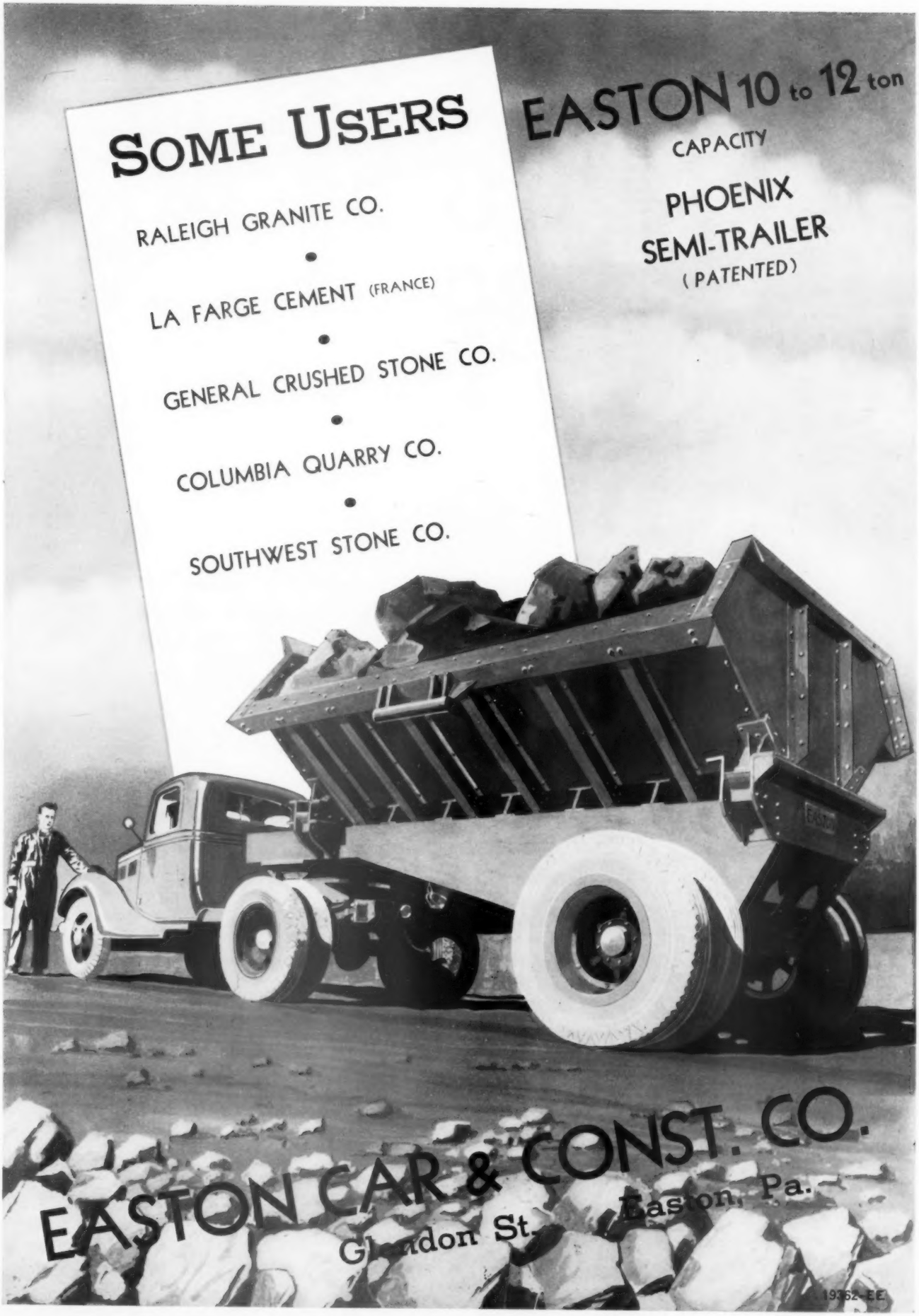
We Produce.....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The 1939 Directory section of Pit and Quarry HANDBOOK is the most complete ever published. It is up to the minute—as modern as skill and money can make it. It's checked and double checked. Ready about Feb. 1st.

It gives you the names of the companies, their officers, the number and locations of plants, their capacities and equipment, and the names of the men who buy.

The technical section gives the latest production methods and practices. And there are consolidated catalogs of equipment.

The new and 32nd edition will be of greatest benefit to those who order promptly and receive their copy immediately. Use coupon below. Select either the complete Handbook and Directory, or the convenient Directory alone in smaller, flexible binding, more convenient for salesmen. The price is the same in either case.

First Copies Ready About Feb. 1 . . . Reserve Yours Today

Pit and Quarry, Date.....

538 S. Clark St., Chicago, Ill.

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Please send.....copies of the 1939 DIRECTORY ($10.00 per copy) ☐ Send Invoice with book

Name ..... Title.....

Company .....

Town ..... State .....

EACH YEAR MORE USERS of SHOVELS, DRAGLINES and CRANES turn to LIMA FOR GREATER VALUE

1936 1937 1938

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SHOVEL AND CRANE DIVISION
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SEATTLE 1932 First Ave. South
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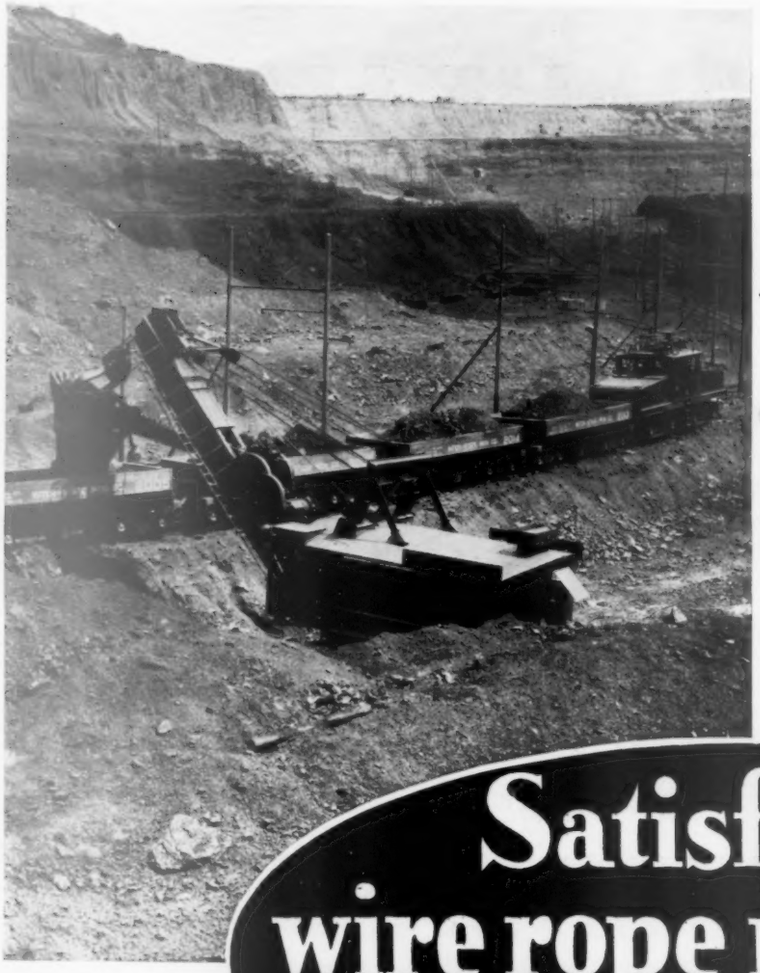
Tyee Machinery Company, Vancouver, B. C.

COMPLETE LINE 3/4 to 3 yards CAPACITY



Satisfy your wire rope needs with *Precisionbilt* Ropes

OTHER J & L STEEL PRODUCTS:

Standard Pipe in seamless and welded—Seamless Steel Boiler Tubes — Hot Rolled Shapes — Abrasion Resisting Plates—Bar mill products including Bars for Concrete Reinforcement — Bar size shapes — Track Spikes — Wire Nails and Spikes — Galvanized Sheet Steel Roofing and Siding—Woven Wire Fencing — Barbed Wire — Soft Annealed Wire.

Gilmore Precisionbilt Shovel Ropes are so perfectly fabricated as to completely eliminate interstices, because of the close tolerances (1/1000 of an inch) to which they are built, and Pits and Quarries need the protection of such a rope more than nearly any other operation using Wire Rope.

Furthermore the variation in tension to which Wire Rope is subjected in Pits and Quarries demands a rope such as we offer. Because of its precision it has longer life and gives much better service generally—thus proving more economical to use.

We urge you to try a new Gilmore Precisionbilt rope on your next replacement and learn first-hand of its greater value to you.

Send for our new catalog now on the press.

GILMORE WIRE ROPE DIVISION

MUNCY · PENNSYLVANIA

JONES & LAUGHLIN STEEL CORPORATION **J&L STEEL**

PITTSBURGH · PENNSYLVANIA

STEP UP YARDAGE *with* MARION

URDY

Today, more than ever before, you need an excavator that is faster and more dependable. It is a fact that major contracts are being awarded to contractors who are basing their bids on what they know they can do with modern equipment. • • • Consider MARION excavators in this light. They are built to give you maximum yardage at low operating cost. They incorporate many new and modern features that simplify the biggest and toughest of earth moving jobs. They are the ultimate in dependable operation . . . proven performance. • Compare the new, modern MARION, point for point, with any machine of its size on the market. Contractors who have, choose Marion.

THE MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

CRANES • DRAGLINES • SHOVELS
CLAMSHELLS • PULL SHOVELS

FAST

Ferguson & Edmonson Co.
Pittsburgh, Pa.

TWO MODERN MARIONS are owned and operated by the above company and are used extensively on general contracting.

The Arundel Corporation
Baltimore, Md.

This company has MODERNIZED with MARIONS. Three modern Marions are being used on major construction contracts.

Dolese & Shepard Company
Chicago, Illinois

The importance of Modernizing with Marions is reflected in the TWO Modern Marions now being used by the above company.

MODERNIZE WITH MARIONS
FROM 3/4 CU. YARDS UP

Write for bulletins describing the size of Marion in which you are particularly interested. If you are not receiving THE GROUND-HOG regularly, ask to be put on the mailing list. » » »

Forward Steps to Greater Safety in Electric Blasting Caps

Atlas Manasite. For greater safety, Atlas Manasite gives full detonating efficiency with reduced sensitivity to impact and friction. This lessens chance of accident through inadvertent mishandling.

Atlas Insulated "Match-Head." For greater safety, the Atlas Match-Head Electric Blasting Cap provides accurate, reliable firing and positive insulation of the firing device from the copper shell.

Atlas Safety Shunt. For greater safety, Atlas Metal Safety Shunts protect against accidental firing by short-circuiting the leg wires.

Atlas Accordion Fold. For greater safety, this convenient tube encloses many folds of wire to protect the detonator.

When you review the history of electric blasting cap progress, you can't escape the conviction that Atlas improvements have been high spots in leading the advance toward greater safety and more effective detonating methods. "Atlas Firsts"—the Match-Head, the Safety Shunt, the Accordion Fold, and Atlas Manasite—each has given greater effectiveness to safety precautions. Each has contributed to efficient and economical blasting. Ask your Atlas representative.

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Cable Address—Atpowco

Everything for Blasting

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Denver, Colo.	Los Angeles, Calif.	Picher, Okla.	San Francisco, Calif.	Wilkes-Barre, Pa.

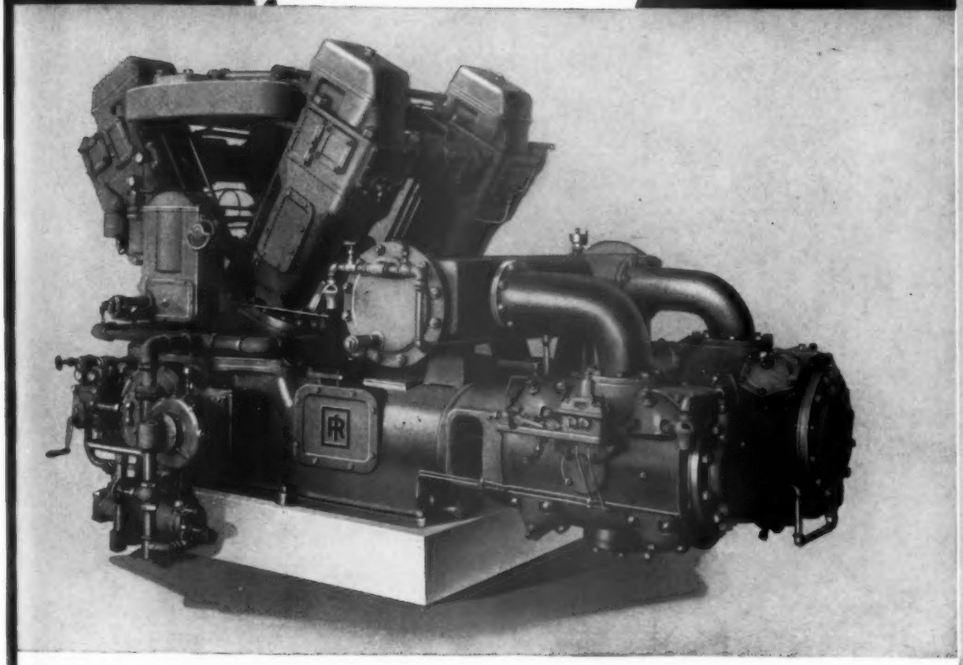
ATLAS

EXPLOSIVES

CHEMICALS ATLAS EXPLOSIVES

THE BIG THIN
WE MUST CONSIDER
IS ECONOMY

THAT'S JUST WHY
I PICK THE NEW XVO



When economy dictates the use of Diesel power for compressing air or gas, the same reason demands the selection of the most economical Diesel-engine-driven compressor on the market.

Economy is built into Ingersoll-Rand's new XVO. Using Diesel oil costing 6 cents per gallon, the XVO will compress 1000 cubic feet of free air to 100 pounds pressure for a fuel cost of slightly over 1¢. Similar economies are obtained when compressing air or gas to other pressures.

I-R Products: All kinds of Compressors, Rock Drills, Pneumatic Tools, Oil Engines, Pumps, Condensers, Refrigerating Units.

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Birmingham
Boston
Buffalo
Butte
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Cincinnati
Cleveland

Ingersoll-Rand
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Duluth
El Paso
Hartford
Houston
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Newark
New York

IR Type

XVO

DIESEL-ENGINE-DRIVEN COMPRESSOR

The XVO combines a heavy-duty, four-cycle Diesel engine and a horizontal heavy-duty, double-acting compressor in a single, compact and comparatively light-weight unit.

•

Sizes are available with 4, 6 or 8 power cylinders. For 100-lb. compression these sizes are rated at 625, 935 and 1250 cfm. actual free-air capacity.

•

The XVO is conservatively rated for 24 hours-a-day full-load service. Rotative speeds and piston speeds are considerably lower than those of other units offered for similar service.

•

The arrangement of two V-type power cylinders for each compressor crosshead results in smooth operation and an important reduction in foundation requirements.

•

The fuel and combustion systems are the same as those of the famous and thoroughly proved Ingersoll-Rand Type S Diesel engine.

•

The XVO has the same frame, running gear and compressor used by the popular I-R gas-engine-driven XVG compressor, of which there are more than 125,000 installed horsepower.

•

Compressor cylinders can be furnished for vacuums, for pressures up to 5000 lb. per sq. in., and for air, gas or ammonia compression.

A new bulletin describing in detail the money-saving features of the XVO has just been printed. Ask for Form 3072.

•

680-1

YOUR present loading equipment may be operating at only part of its capacity. The need for new equipment capable of giving you increased output at lower unit costs may seem remote. But farsighted executives are laying the foundation now for future profits.

Upswings in business gather momentum fast. By planning modernization of your equipment now, you will be able to take immediate advantage of the upswing when it grows—make the most, in volume and profits, of the opportunity.

It will pay you to investigate fully the increased savings and output you can get from the "Years Ahead" machines in the complete line of Bucyrus-Erie quarry and mining excavators. Tomorrow's savings are planned today!

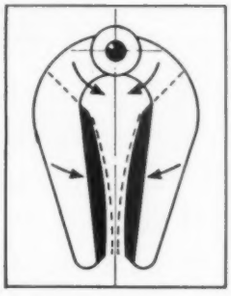
BUCYRUS-ERIE

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

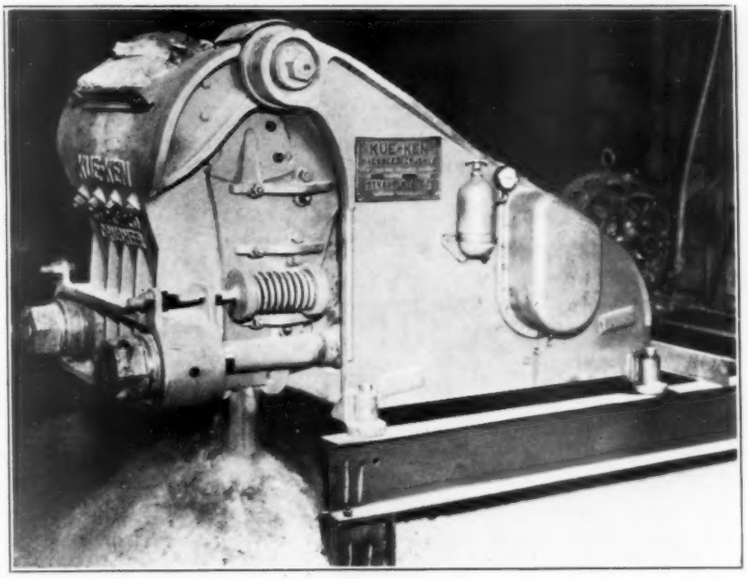
OVERBOARD *with* OLD IDEAS!

CRUSH FASTER AND FINER WITHOUT ABRASION IN A

KUE-KEN BALANCED CRUSHER



See the new KUE-KEN crushing principle—follow the arrows. A pair of free swinging balanced pendulum jaws pivoted at the top. When moving together every part of each jaw moves downward with the rock stream. No rubbing, no abrasion, therefore less wear and lower cost crushing.



An unretouched photo of a No. 50 KUE-KEN crusher crushing 90 lb. pieces of quartz to ⅛ inch at the rate of 13 tons per hour—and without abrasion! The same machine crushes 55 tons per hour to 3 inch.

This entirely new and better principle of crushing means

1. No need of several crushers, rolls, bins, etc.
2. No lifting of useless weight with the resultant waste of power.
3. No heavy unbalanced masses making slow speed and expensive foundations an absolute necessity.
4. No upward rubbing, abrasive action of the jaws, requiring frequent and expensive replacement.
5. No overloaded poorly lubricated bearings exposed to easy entrance of destructive grit and dirt.

INSTEAD— THE KUE-KEN BALANCED CRUSHER —

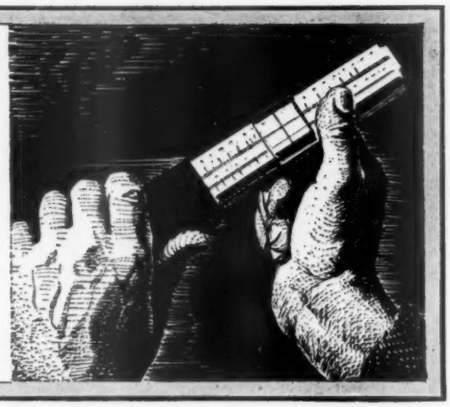
crushes large rocks very fine in a single pass without abrasion. Perfect balance permits small foundations. Mechanism in sealed oil bath and low bearing pressures guarantee economical long life.

SEND TODAY FOR BULLETIN 600

STRAUB MFG. CO. 528 CHESTNUT STREET OAKLAND, CALIFORNIA

Builders of Heavy Machinery for 40 Years

THE ARITHMETIC OF DUST COLLECTION



SOLIDS UNDER
20 MICRONS
50%
(NOT COLLECTED)
NOT COLLECTED
WHEN 50% OF THE SOLIDS ARE UNDER 20 MICRONS A 90% GUARANTEE OF COLLECTION OF ALL SOLIDS OVER 20 MICRONS IS EQUAL TO TOTAL EFFICIENCY OF ONLY 45%

A 90 percent guaranty conditioned on a limiting particle size may cover an actual efficiency of less than 50 percent of total solids or liquids in the gas stream.

Cottrell Electrical Precipitators are unconditionally guaranteed to any efficiency with no limiting strings on particle size or chemical character.

THE *solution of your dust or fume problem demands the consideration of the total solids dispersed in the gas stream, irrespective of particle size or nature.* • Obviously if fifty percent of the dispersoids are smaller than 20 microns, a guaranty of 90 percent efficiency on the plus 20 micron material indicates only 45 PERCENT TOTAL collection. • Cottrell Electrical Precipitators are the only equipment in which the collection efficiency can be made to approximate 100 percent of all solids and liquids entering the collector. Such efficiency is actually guaranteed and obtained in many large installations.

EQUIPMENT TO FIT YOUR JOB

Applications for Cottrell Equipment include the collection of fly ash, flue dust, metallurgical fumes, sulphuric acid fume and mist, cement mill dust, carbon black, and the purification of hydrogen, blast furnace, manufactured fuel gases, roaster gases, etc.

In the field of mechanical collectors, we design and manufacture *Multiclones* for the recovery of all kinds of dust or powder down to 5 microns or smaller.

When optimum removal of such dusts is not required, *Polyclones* are recommended, for any capacity.

Impax Separators, used with Multiclones, classify mixed dust and deliver the coarse material in one hopper while the fines are collected in another.

The equipment listed here provides for installations of any type or combination of types to control any dust, fog, fume or mist condition in any industry to any desired efficiency and for any volume, from a few thousand c.f.m. to millions of c.f.m., at any temperature.

Specific and general bulletins are available. State your problem and we will be glad to cooperate.

PIONEERS IN DUST & FUME CONTROL

WESTERN PRECIPITATION CORPORATION
1016 W 9th ST., LOS ANGELES, CALIF.

RESEARCH CORPORATION
405 LEXINGTON AVENUE
NEW YORK CITY, N. Y.

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PIT AND QUARRY

Vol. 31 JANUARY, 1939 No. 7

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Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals.

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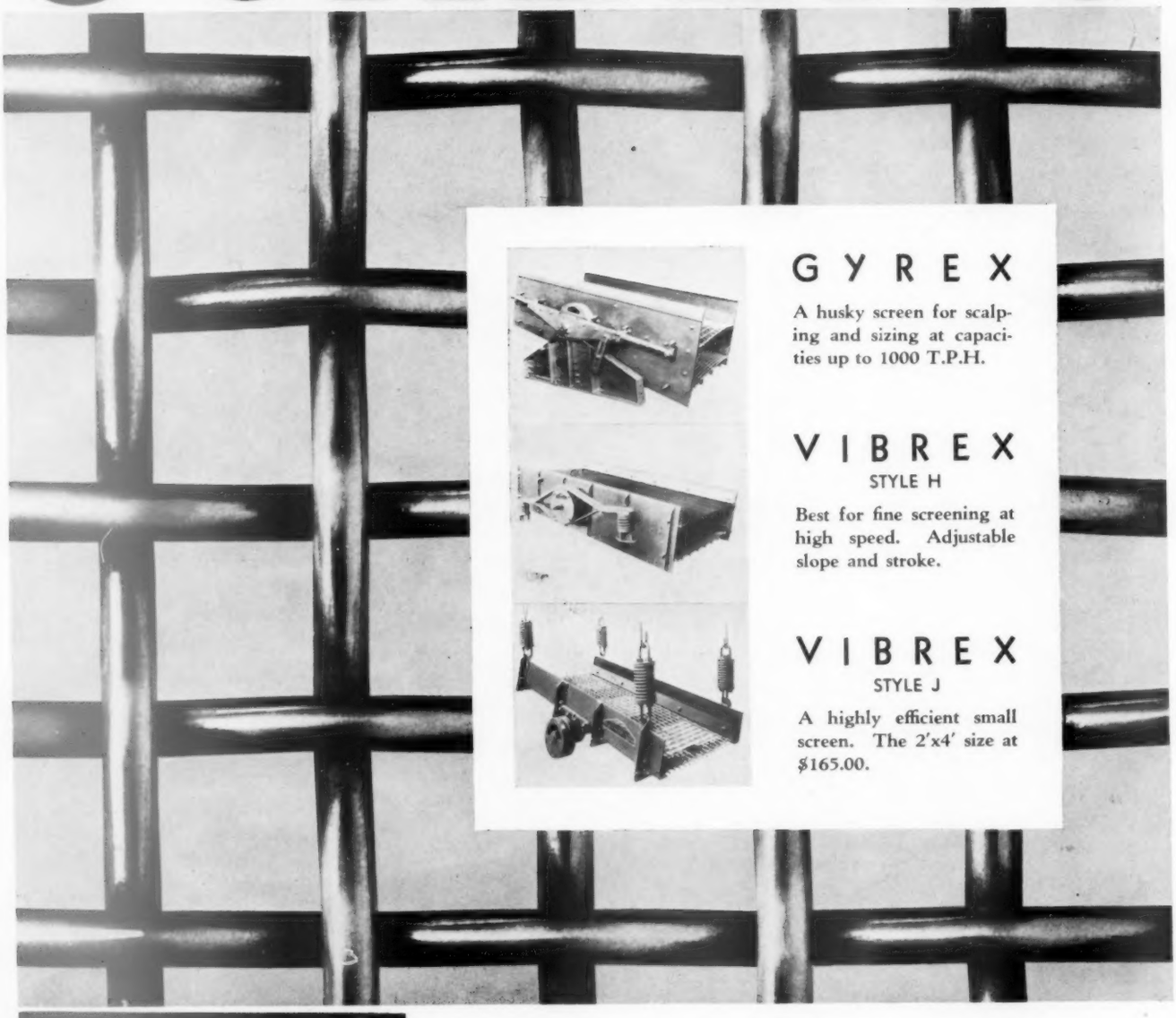

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A husky screen for scalping and sizing at capacities up to 1000 T.P.H.

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Best for fine screening at high speed. Adjustable slope and stroke.

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STYLE J

A highly efficient small screen. The 2'x4' size at $165.00.

MATERIAL HANDLING
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EQUIPMENT

The three types of screens include more than 300 sizes and models. Experience proves that true economy in screening is obtained only when the screen used exactly fits the work to be done.

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Please send me particulars about your screens.

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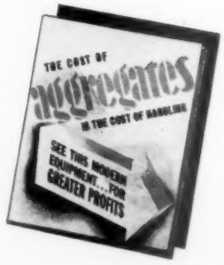
Firm .....

Address .....

City ..... State .....

Send for the folder "AGGREGATES" showing in picture form the many items you can profitably install to lower your operating cost.



PIT AND QUARRY

CHICAGO JANUARY, 1939

Associations Prepare Convention Programs

FIRST GATHERING ON JAN. 25

Aggregates producers and members of the ready-mixed-concrete industry will descend on Cincinnati, O., during the last week in January for the annual conventions of their respective associations. Convention headquarters and the machinery exhibit will again be in the Netherland-Plaza Hotel. First will come the gathering of the National Sand & Gravel Assn. on January 25, 26 and 27, with the National Ready Mixed Concrete Assn. meeting on the same dates. Three days after these two organizations end their meetings, the National Crushed Stone Assn. will open its convention, the dates being January 30, 31 and February 1.

Developments in Washington, D. C., during the last few years have been of interest to all industry and the sand-and-gravel members will consider such matters as the Federal Wage-and-Hour Law, including questions and answers regarding the impact of this ambitious legislation on every member of the sand-and-gravel industry; the forthcoming determination of minimum wages in the sand-and-gravel industry under the Walsh-Healey Act, and a review of the effect of this legislation on sand-and-gravel contracts already executed under this Act; the joint congressional-executive investigation of industrial practices in the United States for the purpose of determining upon the desirability of amendment of the anti-trust laws and other Federal regulatory legislation; the National Labor Relations Act, more familiarly known as the Wagner Act—a law which went into effect just as the sand-and-gravel industry felt the effect of unionization drives, accompanied by boycotts and arbitrary demands for recognition of unions; and such other Federal questions as the revenue laws, Federal highway appropriations, Federal subsidies for the construction and operation of sand-and-gravel plants, the WPA program, and the PWA program.

Engineering and merchandising problems and economic questions of importance will also come up for discussion, while a round-table discussion on operating problems will be an important program feature.

Business prospects for 1939 will be predicted for the crushed-stone association by Gordon Hayes, professor of economics of Ohio State University while developments in the legislative field will be told by John C. Gall, general counsel of the National Assn. of Manufacturers. Other papers to be presented at the N.C.S.A. gathering will include *Streamlining Our Highways,* Charles M. Upham, engineer-director, American Road Builders' Assn.; *Limestone Screenings and Stabilized Emulsions,* Frederick H. Gross, department of parks of the City of New York; *The Harrisburg - Pittsburgh Superhighway,* S. W. Marshall, chief engineer, Pennsylvania Turnpike Commission; and *The Transportation Question in Its Broader Aspects,* by J. B. Hill, president, Louisville & Nashville R. R.

Advance reservations are urged for those who plan to attend any of the conventions as hotel facilities are usually taxed to a great extent.

Universal Erects Pipe Plant at Somerset, Pa.

Another concrete-pipe plant is being added to the chain of those operated by the Universal Concrete Pipe Co. of Pittsburgh, Pa.

The new plant, located at Somerset, Pa., will be housed in a concrete-block structure 60 ft. by 140 ft. in size and will be ready to start production in January.

Monolith Fires Blast at Tehachapi Quarry

Utilizing 42 tons of explosives, the Monolith Portland Cement Co. set off a blast in its quarry near Tehachapi, Cal., on Sunday, Dec. 4, which loosened sufficient raw material to keep the plant operating for many months.

Many Plants Suffered Fire Damage in 1938

TIMBER CONSTRUCTION BLAMED

Although the production of construction materials which will not burn constitutes perhaps 90 per cent. of the output of the pit-and-quarry industries, too many plant operators continue to erect or operate plant structures of timber construction and hardly an issue of PIT AND QUARRY appears without reference to one or more fires among plants.

During 1938, many disastrous fires occurred, some of which totally destroyed the operation involved, others causing expensive damage and production delays. Plants which suffered fire damage included the following:

American Rock Wool Co., Wabash, Ind., Standard Slag Co., Wheeling, W. Va.; J. A. Eck & Sons, Montoursville, Pa.; Roy L. Houck Co., Salem, Ore.; Watson Sand & Gravel Co., Amite, La.; George Scofield Co., Tacoma, Wash.; Old Colony Crushed Stone Co., Quincy, Mass.; Barnsdall Tripoli Co., Seneca, Mo.

Beyer Crushed Rock Co., Kansas City, Mo.; Morris Limestone Products Co., Morris, Ill.; Massachusetts Broken Stone Co., Stony Brook, Mass.; Illinois Minerals Co., Murphysboro, Ill.; Jones Concrete Products Co., Wilmington, Del.; Blue Diamond Service Corp., Malden, Mass.

Canyon Rock & Gravel Co., Mission Gorge, Cal.; Winona Sand & Gravel Co., Winona, Minn.; Moapa Minerals Co., Overton, Nev.; Martin Bros. Cement Block Wks., Yardville, N. J.; Cincinnati Quarries Co., Cincinnati, O.; Heidig Concrete Block Co., Gordonville, Pa.; Pioneer Sand & Gravel Co., Tacoma, Wash.; Shaull & Sons Stone Quarry, New Kingston, Pa.

Camden Lime Co. has been established at 1433 Pine St., Camden, N. J., to engage in the ready-mixed-concrete business. Twenty-six workers are employed.

Rise in Construction Volume Is Predicted

NOVEMBER TOTAL AT NEW PEAK

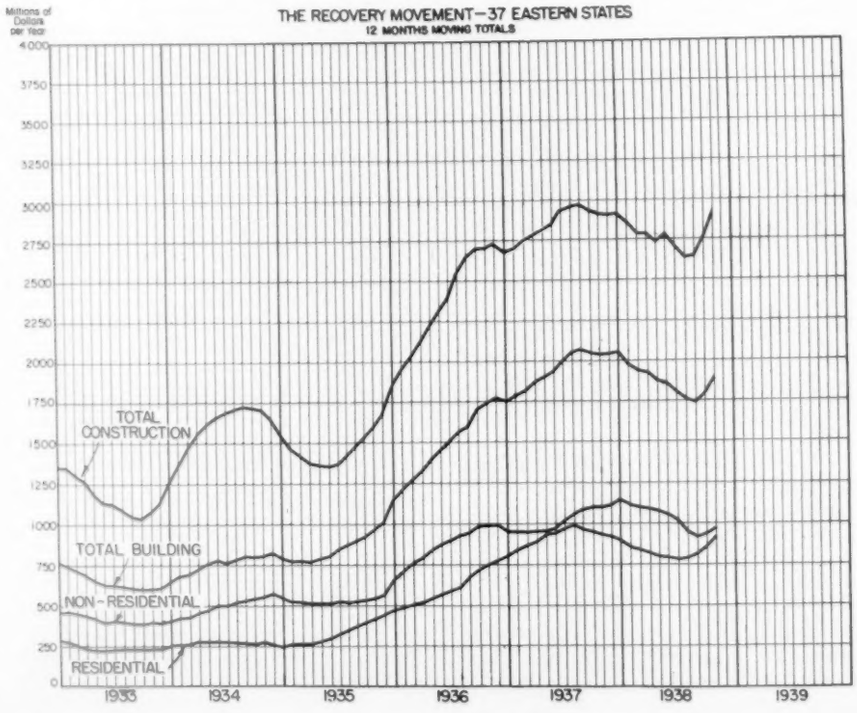
Construction contracts to be let in the 37 Eastern states during 1939 may reach a total of $3,500,000,000, according to estimates released by F. W. Dodge Corp. This figure would compare with an estimated total of $3,200,000,000 for 1938, and an actual total of approximately $2,900,000,000 in 1937. None of these figures include repair and maintenance work. This national construction news organization points out that the total building and engineering volume recorded from January 1 through November 15 of this year reached a total of $2,635,000,000 compared with $2,599,000,000 in the corresponding period of 1937, and anticipates that considerable letting of public works contracts before the end of this year will materially increase the spread between the final 1938 and 1937 figures. For 1939, indications of increased volume in public and private residential building, commercial and factory building, and public utility construction are stated to be very good.

Reviewing such factors as the recent marked upturn after last year's recession, increased employment, the revival of business optimism after a period of excessive fears, and the widely held view that recent election results are favorable to business progress, Thomas S. Holden, vice-president in charge of statistics and research in the Dodge organization, states: "All these favorable factors might conceivably lead to a sustained construction revival to continue without serious interruption for several years. Yet, such a course is by no means certain, and present optimism should be tempered with reasonable caution."

According to Mr. Holden's view, three potential factors would tend to curb recovery, if they should become actual in 1939. First, there is the question whether private building and engineering work will increase fast enough to offset the tapering off of PWA projects now scheduled for the second half of next year. Second, concurrent rises next spring in public and private housing activity, public works projects, and new industrial developments stimulated by a defense program might bring about increases in construction costs so rapidly as to curtail private operations. The third factor is the possibility of international difficulties; a new war threat would upset all present calculations and, lacking that, international trade complications might react unfavorably on American business and thus indirectly upon construction.

The estimate for 1939 indicates that residential building, commercial building, and public-utility construction may each increase about one-third over 1938, and that factory construction might double 1938's very low volume. Public and institutional buildings and public engineering works would decline appreciably unless there should be a new Federal public works program, of which there is no indication today.

The November total of construction contracts awarded in the 37 Eastern states, amounting to $301,679,000, was the highest November total since 1929, according to F. W. Dodge Corp. This figure was 52 per cent. ahead of the November, 1937 total. The accumulated total for the first eleven months of 1938 is $2,807,489,000, compared with $2,703,609,000 for the first eleven months of last year. During the first eleven months of 1938, the dollar total of public construction contracts was $1,425,317,000 compared with $1,036,890,000 in the first eleven months of last year. This year's volume of public construction expenditures has been divided as follows: $528,764,000, or 37 per cent. for buildings, and $896,553,000, or 63 per cent. for engineering structures.



Quarry at Snake Butte Is Closed for Winter

The government-operated quarry at Snake Butte, Mont., supplying stone for construction work at Fort Peck dam, shut down for the winter on Nov. 10. Since the quarry started operations on a small scale last March, a total of 246,000 cu.yd. of stone have been shipped. Between 500 and 700 men were engaged in quarrying operations during the summer, 100 of whom remain to carry on equipment repair and miscellaneous operations throughout the winter.

Coming Events

January 25-27, 1939, Cincinnati, O. — Annual conventions, National Sand & Gravel Assn. and National Ready-Mixed Concrete Assn., Netherland Plaza Hotel.

January 30, 31 - February 1, 1939, Cincinnati, O. — Annual convention, National Crushed Stone Assn., Netherland Plaza Hotel.

February 7-9, 1939, Chicago, Ill. Annual conventions, National Concrete Masonry Assn., American Concrete Contractors' Assn. and Concrete Industries Exposition, Hotel Sherman.

February 23-25, 1939, San Francisco, Cal. Annual convention, American Concrete Pipe Assn.

March 7-10, 1939, San Francisco, Cal. Annual convention and show, American Road Builders' Assn., Civic Auditorium.

Dismiss Dust Action Against Cowell Firm

ESCAPE NOW BEING REDUCED

Because the Cowell Portland Cement Co. is making every effort to reduce the amount of dust emanating from its plant at Cowell, Cal., and has reduced the amount escaping from the entire plant to below the maximum of 2.25 tons per kiln per day as specified by court order, the contempt citation sought by ranchers in that vicinity has been dismissed by the court.

It was shown that the Cowell company is making plant changes and improving its dust-collecting equipment so that strict compliance with the order will be possible. W. Harry Archer, engineer, produced figures showing that when a test was made on July 7, it was found that 3.10 tons per kiln per day escaped from the plant. Subsequent tests, however, showed the emission of dust was progressively lower until on November 13 the escape was only .942 tons.

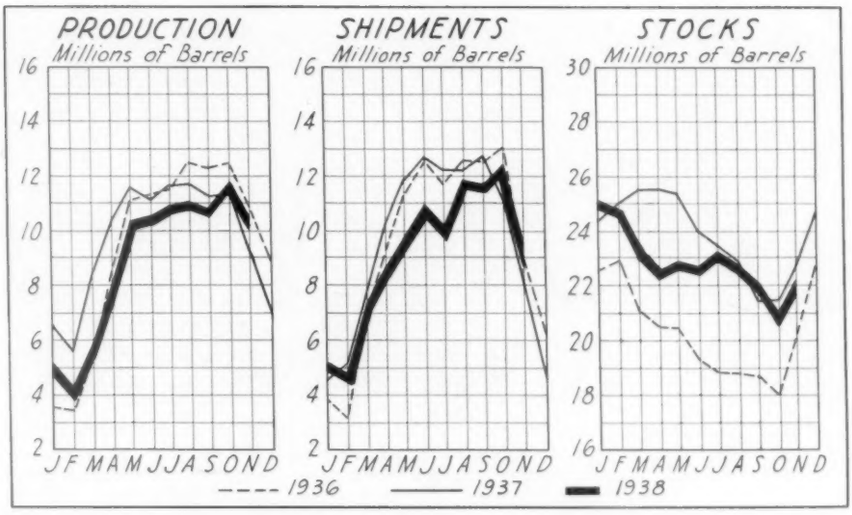
Recent Equipment Installations ★ ★ ★

William H. Ryan & Sons, Inc., Norwich, Conn., has installed three new vibrating screens and a 1¼-cu.yd. Koehring shovel at its Mounville quarry plant . . . *A new towboat being built this winter by the Missouri River Sand & Gravel Co., Boonville, Mo., will be powered by two Gray marine engines* . . . A P & H 1½-cu.yd. gasoline shovel has gone into service at Varney Bros. gravel pit at Milford, Mass.

John J. McHale & Sons, Inc., Pawtucket, R. I., has installed Butler bins and batcher and is delivering ready-mixed concrete with a T. L. Smith truck-mixer . . . *The Morse Sand & Gravel Co., Pawtucket, R. I., recently put in a 2½-ft. by 6-ft. Kennedy vibrating screen* . . . Ten Insley 4-cu.yd. concrete buckets have been sold by the Insley Mfg. Co. for service at Grand Coulee Dam.

The Martin Berger Block Mfg. Co., Detroit, Mich., recently placed a Stearns Joltcrete machine in service . . .

Screen Equipment Co. Seco vibrating screens recently purchased by producers include two 4-ft. by 8-ft. double-deck units by the Columbia Quarry Co., St. Louis, for its Krause, Ill., plant; a 3-ft. by 8-ft. triple-deck and a 4-ft. by 8-ft. double-deck unit by the Binghamton Crushed Stone & Gravel Corporation for its plant at Johnson City, N. Y.; a 4-ft. by 8-ft. screen by the Buffalo Gravel Corp., Buffalo, N. Y.; a 2-ft. by 8-ft. screen by the American Nepheline Corp., Rochester, N. Y.; a 2-ft. by 6-ft. unit by J. J. Macklin, Steward, Ill.; a 3-ft. by 10-ft. double-deck screen by the Seneca Gravel Co., Buffalo, N. Y., and a 4-ft. by 10-pt. triple-deck screen by J. & L. Stouffer, Inc., Dublin, O.



The Portland-cement industry in November, 1938, produced 10,184,000 bbl., shipped 8,573,000 bbl. from the mills and had 22,180,000 bbl. in stock at the end of the month, according to the U. S. Bureau of Mines. Production was 10.1 per cent. higher and shipments up 4.7 per cent. as compared with November of 1937. The industry utilized 48.2 per cent. of its capacity in November, 1938; for the same month a year ago the figure was 43.7 per cent.

U. S. Gypsum Establishes Industrial Fellowship

Dr. Edward R. Weidlein, director, Mellon Institute, Pittsburgh, Pa., has announced the establishment of an industrial fellowship in that institution by the United States Gypsum Co., Chicago, Ill. This fellowship will conduct fundamental research on various products manufactured by the gypsum company, with the objective of developing new processes and technics which will have broad application in the field of building materials. This investigational work will augment the regular research activities carried on by the donor.

Dr. H. E. Simpson, who has been appointed to the incumbency of the U. S. Gypsum Co. fellowship, has been a member of Mellon Institute since 1936.

Texas Workers Condemn Non-Union-made Cement

Texas workers at a meeting at Waco recently of the Southwest District Council of Cement, Lime, Gypsum and Allied Industries Workers adopted a resolution condemning the use of non-union-made cement on public-works projects.

The delegates also protested the spending of taxpayers' money on foreign-made cement and cement produced by prison labor.

New $250,000 Operation on Norfolk Waterfront

Operations have been started at Norfolk, Va., by the recently-established Southern Materials Corp. with a plant investment of $250,000. The concern is producing sand, gravel and ready-mixed concrete, the yards being located on the river front. Materials are dredged from the James River, three dredges being in service and 20 barges are employed to transport the sand and gravel to the yards.

H. B. Roberts is president of the concern and James P. Sadler is plant manager.

Truck-Mixer Observed as New Christmas Toy

Toys which are simplified scale models of the machinery of construction have been much in evidence during the Christmas season. Excavators, dump trucks, tractors with crawler treads, etc., were popular sellers. Perhaps the newest toy of this type observed was a ready-mixed-concrete truck — revolving body, charging door and discharge chute included.

A Turkey for Each Man Working at This Plant

Following its annual custom, the Pacific Rock & Gravel Co., Monrovia, Cal., presented each of its 70 employees with a turkey on the day before Thanksgiving.

Correction

Unfortunately, due to misinformation furnished by one of the officials of the John E. Redman Sand & Gravel Co., Rochester, N. Y., three double-deck vibrating screens which that company recently installed were wrongly identified as to their manufacture. They were made and installed by the Screen Equipment Co. of Buffalo.

At the Conchas Dam project in New Mexico, sand and gravel are excavated and hauled to the aggregates plant by four 12-cu.yd. Le Tourneau Carryall scrapers drawn by Caterpillar tractors. Two of these units are shown in the picture discharging their loads to the plant belt-conveyor.

Ready-Mixed Concrete Held Not "Perishable"

The request made by the National Ready Mixed Concrete Assn. through its executive secretary, V. P. Ahearn, that ready-mixed concrete be declared "perishable" and as, such, be exempt from the strict interpretations of the Walsh-Healy Act regarding wages and hours, has been denied by Administrator L. Metcalfe Walling.

According to Mr. Walling such concrete, despite the need for prompt delivery and placement to avoid spoiling before hardening sets in, is not perishable within the terms of the Act for the reason that "the quality of perishableness is not inherent in any of its components or in itself but is merely a condition superinduced for a short time during a certain period of processing."

Gravel Firm Buys Fleet of Trucks for Dam Job

The Camargo Sand & Gravel Co. of Woodward, Okla., has taken delivery on a fleet of ten Ford heavy-duty trucks equipped with 7-ton Heil dump bodies for use on the Fort Supply Dam project, on which the Camargo concern has the contract.

The equipment was purchased through the Leland Equipment Co., Tulsa distributor.

Supplies Equipment to Unusual Plant in Texas

An interesting contract for an 8-ft. by 100-ft. rotary cooler of special construction, a 7-ft. by 30-ft. dry-grinding compeb mill and a 600-hp., 2200-volt synchronous motor with clutch and starter was recently received by the Allis-Chalmers Co., Milwaukee, Wis.

This equipment, which was ordered by the George S. Mepham Corp., East St. Louis, Ill., is to be incorporated in a new special processing plant now under construction near Texarkana, Ark. The plant will use as a principal raw material iron ore found in large quantities in East Texas. This ore will be crushed, washed, screened and calcined in a rotary kiln at very high temperature. Following this it will be cooled and ground in the equipment above mentioned.

The principal product of the plant will be a high-gravity material sold under the name of "Colox," which is used as an ingredient of oil-well drilling mud. This heavy gravity mud is an essential material required in the drilling of oil wells, particularly extremely deep wells.

National Ships First Gypsum to Savannah

The first shipment of gypsum rock from Nova Scotia to Savannah, Ga., where the National Gypsum Co. is erecting a new plant, was completed in December.

It will be several months before the new plant begins operating, however.

Extension of Dredging Permit Is Sought

The Ohio Valley Sand Co. of New Martinsville, O., has applied to the U. S. War Department for an extension of its permit to dredge sand and gravel from the Ohio River between Huntington, W. Va., and Powhatan Point, O.

Medusa Acquires Site for Holland Warehouse

A dock and warehouse formerly owned by the Goodrich Transportation Co. at Holland, Mich., has been acquired by the Medusa Portland Cement Co., Cleveland, O.

The site will be utilized as a distributing point by the cement company.

Contractors Exempt from Gravel Royalty

BUT ARKANSAS PRODUCERS PAY!

Sand and gravel may be removed from beds of navigable streams for road construction purposes without payment of the Arkansas severance tax, provided the removal is by contractors actually doing road construction work, Attorney General Jack Holt has advised Z. M. McCarroll, Arkansas revenue commissioner.

The attorney general held that the state owned sand and gravel in the beds of navigable streams up to the high water mark, and declared that the statutes require persons removing sand or gravel from beds of navigable streams in road building to keep a detailed account of the materials removed.

The tax law provides for payment of a severance tax of 2½ c. per cu.yd. on sand and 5 c. per cu.yd. for gravel removed from navigable streams for other purposes. The exemption for road building does not apply to removal of sand and gravel by commercial producers for sale to contractors engaged in road building.

Symposium on Lime to Feature A.S.T.M. Meet

A symposium on lime will be a feature of the spring group meeting of the A.S.T.M. at Columbus, O., March 6-10, 1939. The symposium is being developed under the sponsorship of Committee C-7 on Lime, J. R. Withrow, chairman. A number of technical papers are in the course of development covering the properties and testing of lime and the relationship of manufacturing to the properties of lime.

Riverside Sells Lyons Quarry for $225,000

The Riverside Lime & Stone Co. has sold its quarry at Lyons, Ill., to the Material Service Corp. of Chicago, Ill., for a cash consideration of $225,000, according to reports.

Denver Gravel Concern Announces Name Change

The name of the J. W. Brannan Sand & Gravel Co., Denver, Colo., is now Spratlen-Brannan, Inc. The management remains the same, F. P. Spratlen, Jr., being president and treasurer.

The Centropolis Crusher Co. of Kansas City, Mo., has acquired a 33-acre tract adjoining its quarry and plans to open the new deposit shortly.

News Highlights of 1938

JANUARY

Florida's $3 per ton inspection fee on imported cement ruled illegal by three-judge Federal Court . . . Geoff A. Saeger appointed chief chemist as new Houston plant of Gulf Portland Cement Co., goes into production . . . Industry groups gather at Cincinnati for annual conventions . . . Anderson-Dunham Concrete Co. erects a new ready-mixed-concrete plant at Baton Rouge . . . Celotex Co. acquires Gulf Gypsum Co. . . . Earnings of Canada Cement Co. $1,000,000 higher than in 1936. . . . National Sand & Gravel Assn. opens new laboratory at University of Maryland.

FEBRUARY

Truckers' union wins right to unload concrete, refuting claims of engineers' union, in A.F. of L. decision . . . National Gypsum Co. acquires Best Bros. Keene's Cement Co. . . . Earl Barnett succeeds Wm. H. George as general manager of Cowell Portland Cement Co.

MARCH

Floods cause millions of dollars worth of damage to plants in California . . . Six cement companies sued by state of Texas for alleged price-fixing . . . Fire causes $75,000 damage at Wabash, Ind., plant of American Rock Wool Co. . . . Marquette Cement Mfg. Co. announces plans for $250,000 river terminal at Vicksburg.

APRIL

The M. J. Grove Lime Co. announces plans to erect lime plant at Middletown, Va. . . . Canadian Gypsum Co., Ltd., equips Toronto plant for production of mineral wool . . . Portland Cement Assn. appoints J. E. Dunn district engineer at Richmond, Va. . . .

MAY

State Sand & Gravel Co. installs lime-putty plant at Indianapolis . . . Lone Star Cement Corp. announces plans to spend $2,075,000 for plant improvements . . . Stephen Stepanian, Columbus, named president of Ohio Ready-Mixed Concrete Assn., at organization meeting . . . Building activity continues to maintain pace . . . W. A. Davis elected president of Standard Portland Cement Co. . . . National Lime Assn. convenes at Cincinnati.

JUNE

Annual No-Accident drive on in cement plants under Portland Cement Assn. sponsorship . . . National Gypsum Co. announces plans for new $900,000 plant at Savannah, Ga. . . . W. P. A. takes bids on $12,000,000 worth of cement and aggregates . . . Henry J. Kaiser Co., San Francisco, Cal., discloses surveys being made for new Pacific Coast cement plant . . . Chubbuck Lime Co. installs rotary kiln at Chubbuck, Cal.

JULY

First conviction under New York silicosis code for failure to use dust-removal equipment on drills . . . Plans for participation in New York World's Fair of 1939 revealed by Portland Cement Assn. . . . Lehigh Portland Cement Co. to modernize its plants at Union Bridge, Md., and Alsen, N. Y.

AUGUST

Colonial Sand & Stone Co., New York, N. Y., Dieselizes truck fleet, buying 69 new units and converting nearly 100 older gasoline-powered trucks . . . Eastern concrete-pipe makers cited by Federal Trade Commission for unfair trade practices . . . Cement prices rise in New England and Middle Atlantic states . . . County-owned gravel pits ordered to cease selling gravel on open market in Ohio.

SEPTEMBER

United States Gypsum Co. announces plant to be built at Jacksonville, Fla. . . . Construction awards, aided by new P.W.A. grants, highest in over a year . . . Federal Public Contract Board prescribes wage rates for cement plants ranging from 40c. to 65c. per hr. . . . George B. Poore, Jr., succeeds R. H. Townsend as superintendent of Calaveras Cement Co.

OCTOBER

New Fair Labor Standards Act goes into effect . . . Six-months' strike of lime-plant workmen at Ste. Genevieve, Mo., ends . . . Twenty lime makers in southern states cited for alleged price-fixing by Federal Trade Commission . . . Fire causes $75,000 loss at silica-sand plant of Illinois Minerals Co. . . .

NOVEMBER

Price war flares anew in southern California with reductions ranging around 30c. per bbl. . . . Sixteen aggregates producers in New Jersey charged with defrauding government of $250,000 through sales to W.P.A. . . . Stirling Tomkins advanced to presidency of New York Trap Rock Corp.

The Innumerable Caravan 1938

WALTER E. HART, Kansas City office manager, Portland Cement Assn.

W. A. CORL, president, Independence Gravel Co., Joplin, Mo.

HOWARD H. SARLLS, 67, plant manager, Koch Sand & Gravel Co., Evansville, Ind.

HARRY L. TARBOX, 80, president, Tarbox & McCall Stone Co., Findlay, O.

GEORGE E. SUTHERLAND, 61, president, West Virginia Sand & Gravel Co., Charleston, W. Va.

JOSEPH D. BAKER, 85, director, Standard Lime & Stone Co., Baltimore, Md.

COL. SAM TATE, 78, chairman of the board, Georgia Marble Co., Tate, Ga.

GEORGE B. POORE, SR., 69, vice-president, Calaveras Cement Co., San Andreas, Cal.

J. A. BLANKENSHIP, general manager, Colonial Supply Co., Louisville, Ky.

C. BENJAMIN CONDON, 51, general manager, Hawkeye Portland Cement Co., Des Moines, Ia.

LOUIS SCHIRM, president, Grand Canyon Lime & Cement Co. and Mission Lime Products Co., Los Angeles, Cal.

FRED L. WEAR, vice-president, Santa Clara Valley Sand & Gravel Producers Assn., San Jose, Cal.

J. E. TRIGANNE, sales manager, Asbestos Corp., Ltd., Thetford Mines, Que.

CHAS. D. WRIGHT, 73, former general sales manager, Missouri Portland Cement Co., St. Louis, Mo.

JAMES P. FARRELL, 47, quarry superintendent, Riverside Portland Cement Co., Riverside, Cal.

WILSON D. ROTH, 61, superintendent Nazareth, Pa., plant, Pennsylvania Dixie Cement Corp.

L. L. ALLER, 68, president, Ohio Sand & Gravel Co., Columbus, O.

JOHN F. DEELY, 74, president and general manager, Lee Lime Corp., Lee, Mass.

HARRY O. COLE, 52, manager, Cape Girardeau, Mo., plant, Marquette Cement Mfg. Co.

ARTHUR S. LANE, 73, vice-president, John S. Lane & Son, Inc., Meriden, Conn.

JOSEPH YIKE, Southwestern Portland Cement Co., Osborn, O.

T. WALTER GLASS, New England sales manager, Universal Atlas Cement Co.

WILLIS E. TALLEY, 72, president, Southern Limestone Co., Carthage, Mo.

EDITORIAL

Philosophies in Conflict

ALMOST everywhere one hears the complaint that government and business appear to have become increasingly antagonistic to each other, that something should be done in order to make the relations between them more amicable, that their most conspicuous differences of policies retard the return of the country to "normal prosperity" and of the people to a state of peace and contentment. As the picture is sometimes drawn one would think that large groups of fanatical mischief makers lie awake nights trying to discover new ways in which the differences between government and business can be converted into animosities. Where there should be intelligent and whole-hearted cooperation, there is, say these disillusioned optimists, nothing but bitterness and futile and acrimonious debate.

It seems to us rather naïve to expect that government and business should have like, or even similar, philosophies. Government in its best modern forms exists for the protection of the people whom it serves; its actions are motivated, in theory and very often in practice, by a desire to promote their general welfare. Immediate personal gain is not the objective sought; there is no desire to exact for its services a price greater than their cost.

Business in its modern as well as in its older forms exists for the benefit of its owners; its methods, its actions are devised to enhance their financial worth. Immediate—or short-term rather than long-term—gains are the objectives sought; and it is essential to the attainment of these gains that the price exacted for the services performed shall exceed the cost of supplying them. General welfare in the sense of public welfare forms no part in the establishment, pursuit or attainment of those ends; it has nothing in common with them, but more often than not stands in opposition to them.

The field of government, therefore, is wide and unrestricted, except for the limitations placed upon its activities by statutes and constitutions. That of business is narrow and confined to those activities expressed or implied by its charters or customs. Their spheres of action and influence are not coextensive, although they may at times overlap; usually they are distinct and complementary. What business is the least interested in, when its objectives are considered, is public welfare, which is the particular field of government. What government is the least interested in, when its avowed purposes are considered, is private gain, which is the particular field of business.

The two kinds of activity—that of government in the interest of public or general welfare and that of business in the financial gain of individuals—are almost always mutually exclusive. Although government may at times take over some of the forms of activity that have been customarily engaged in by business, it has not thereby taken over any of the money-gain objectives of private enterprise. Its "trespassing" on the vested rights of business in such directions has resulted from a desire to further the public interest when this seemed to be either neglected or inadequately served, and not to divert to itself the profits that, in the absence of such action on its part, might have accrued to the businesses affected. In such situations government and business are not brought into competition with each other, because in no sense of the word can they be said to be rivals for the same customers or the same patronage; one acts to serve, the other acts to gain. Government activities in the main spring from the service motive, those of business spring from the profit motive. These terms are descriptive only and do not imply any ethical appraisal.

Several months ago, within the period of a single week, two men who have been much in the public eye addressed public gatherings in widely separated cities. One, George H. Davis, president of the Chamber of Commerce of the United States, presented a brief picture of the philosophy of business. The other, Robert H. Jackson, Solicitor General of the United States, presented one of the philosophy of government. Speaking independently and apparently without any knowledge of what the other would say, each one unconsciously gave a fairly broad statement of the policies that motivate the social group that stands behind him—business in the one case, government in the other.

AS was to have been expected, the speech of Mr. Davis voiced his strong opposition to what he termed the "vague political paternalism" that has been offered as a substitute for the doctrine "that invention . . . will meet the necessity". Other forms of political paternalism, such as government grants to railroads, subsidies for shipping and aviation, and tariffs, are evidently not so "vague," for Mr. Davis either overlooked them or decided that it was best not to mention them. Being in the grain business he could understand, and find point in referring to, the government's "paternalistic experimentation" in "restricting the volume of future trading" through the passage and enforcement of the Commodity Exchange Act, but, although the beneficiary of other government activities—such as its investments in sanitation, public health, flood control, navigation aids, and so on—he saw fit to let their advantages to his type of business remain unnamed.

Naturally Mr. Davis opposes large-scale spending on the part of government because it means large-scale

taxation. The taxes of the "political rainmakers," he said, "take away from the resources of business, and are used for the most part by government agencies in such a way as to make it harder for the manager of a business to carry on his job." He said business men should urge their "customers and employees to reflect that government money is *their* money, collected from them in the price of the goods they buy, deducted from the day's pay." (As much, parenthetically, might have been said of business money.) Yet, at another place he complains that taxes come out of business profits, for he said, "Taxes are taken from the margin" (that is, the profit) "which business otherwise would employ for expansion and improvement. The narrowing—in many cases the extinction—of this surplus is a basic reason for the stagnation in industrial construction and the 'heavy-goods' industries". Business does not lack the capital with which to expand, as Mr. Davis wished his hearers to believe, because the amount of idle capital held in this country is probably greater than it has been at any other time. Business lacks the desire, the necessity, to expand.

THE great contrast between the objectives of business and those of government is further emphasized by some of the remarks of Mr. Jackson. Had he spoken after, rather than several days before Mr. Davis, he could hardly have offered better replies to some of the latter's statements than are to be found in his address. Thus, to Mr. Davis' complaint of the increasing difficulties of the business manager imposed by the manner in which government funds are spent we find the following reply:

"Then many of the owners of industry demand lower taxes. . . . They denounce public works as wasteful, and insist that public government confine itself to underwriting their properties against risks of violence, and that steps leading to the demoralization of the masses, which is the only source from which disorder ever proceeds, is none of the government's business. They insist that neither the state nor the city nor the Federal government shall have any voice in the decisions of the businesses which produce this chain of events. They denounce government 'interference' with business. They demand to be let alone."

In explanation of the high costs of government he said that a fair apportionment of them can not be made "unless there is a recognition of the heavy contributions being made at all times by public government to the prosperity of private enterprise, and appreciation of the fact that the cost of present-day government largely represents the cost of social obligations which private industry has laid down." Among these he mentioned the accidents in an industry as "a part of the cost of that industry," and he characterized the cost of unemployment as "as much a social cost of an industry as its pay-roll." "And," he added, "there is a growing awareness that the wear and tear on a man, which leads to his early retirement, is as much a cost of industry as the obsolescence of a machine, although depreciation on men is not included in the usual corporate accounting."

"Remember," admonished Mr. Davis, "no government ever developed new enterprises that created more jobs and more wealth." And in a similar vein Alfred P. Sloan, in urging General Motors stockholders last summer to oppose President Roosevelt's proposals for a graduated tax on corporate incomes, said, "Government does not create wealth; it dissipates wealth." Mr. Jackson's reply to the latter statement is as good an answer to both assertions as any we might make. He said: "Just why is building a highway between two cities a dissipation of wealth, while building an automobile is a creation of wealth? How does he get the idea that building a perfectly unneeded gas station by private industry is creating wealth, while building a needed school house is dissipation of wealth?" And on the subject of highways Mr. Jackson had this to say: "I suppose the most dramatic and significant development of my lifetime is the revolution in transportation which substituted the motor car for the horse. . . . As I see it, the transportation revolution required three things, each of which was indispensable to the success of the others. First, there was the invention and production of cars. This was properly and naturally done by private industry which realized upon it profits that have created tremendous fortunes. There was, also, the manufacture of incidentals, such as oil and gas, which was also properly and naturally taken over by private industry at a great profit. But there was a third necessity. Few cars would be bought to navigate mud holes or to stall in the snow. Real prosperity of the motor industry awaited the building and maintenance of hard-surface highways. There was no profit in that, and that job was left to the government, with ample propaganda to see that it was fully done."

THE complementary nature of the activities of government and private industry could hardly be better illustrated. In many other ways government has made possible or greatly facilitated the establishment and development of individual enterprise, through police protection of property, through franchises granted to public utilities, through the building of public shipping terminals, and the like. That type of government activity is not opposed by business because it furthers business interests, but activities intended to advance the public good are frowned upon, as Mr. Jackson stated it, "by that section of public opinion which wants regulation and discipline by the government and its laws applied only to the masses and not to the corporations or the owners of our big industries."

Such clear statements of different philosophies as Mr. Davis and Mr. Jackson have provided in these public addresses may help to clarify the main points of difference and to bring us to a better understanding of government and business activities and the complementary nature of their relations.

By C. S. RIPPON
Concrete Technician, U. S. Bureau of Reclamation

Aggregates and Concrete Production at Wyoming's Seminoe Dam Project

General view of the damsite and cofferdam. Diversion tunnel at lower right.

General view of mixing plant, shuttle track, and head tower of the high-line cableway.

THE Seminoe Dam and power plant constitute one of the major units of the Kendrick (Casper-Alcova) project being built by the U. S. Bureau of Reclamation. The damsite is located 37 mi. north of Parco, Wyo., and 75 mi. south and west of Casper, Wyo., on the North Platte River. The chief function of the dam is to impound water for irrigation and to generate power for domestic and commercial sale.

The dam is a thin-arch type, 291 ft. high, 85 ft. thick at the theoretical base, 15 ft. thick at the crest, and 525 ft. long. In addition to the concrete in the dam and power-house there is an inclined spillway tunnel 30 ft. in diameter and a spillway gate structure containing 8,000 cu. yd., making a total of 180,000 cu. yd. of concrete to be placed. The dam will create a reservoir 30 mi. long, containing 1,000,000 acre-ft. of water, which is about one year's normal flow of the river. Three generating units, with 15,000-kv.-a. capacity each, will be installed in the power-house.

The dam and appurtenant works are being built for the bureau under contract by Morrison-Utah-Winston-Lawler, contractors. The construction schedule calls for the completion of the dam early in the spring of 1939, with a maximum schedule of concrete placement of 29,000 cu. yd. per month, or 1,000 cu. yd. per day.

The only available aggregate supply was in the natural gravel deposits in the river bed 2½ to 4 mi. upstream from the damsite. Considerable exploration of these deposits was made by the bureau to determine the quality and quantity of aggregate available. The natural grading of the gravel was deficient in cobbles 3 in. to 6 in. in size, and some consideration was given to the use of crushed limestone or granite, available at the damsite, to supplement this size. However, it was decided to use the natural-run gravel and make the necessary adjustments in the mix as required.

The location of the aggregate deposits in the stream bed necessitated the removal of the aggregate during the low-water season and stock-piling near the processing plant. The plant is located 2½ mi. in an air-line upstream from the damsite.

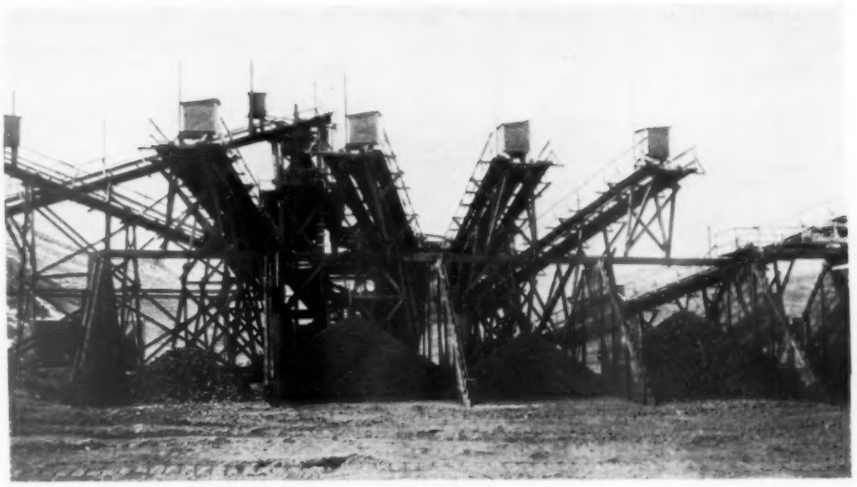
Excavation of aggregate was carried on throughout the period September to

December, 1936, and September to December, 1937. A total of 225,000 cu.yd. of raw material was removed and stock-piled. A 1½-cu.yd. Northwest drag-line and 5 dump trucks (three 8-cu.yd. and two 12-cu.yd. Internationals) were used to excavate and transport the aggregate to storage. Portions of the deposits were covered by from 2 to 6 ft. of overburden, which was pushed aside or into already-excavated areas by a D-8 Caterpillar tractor with a Le Tourneau heavy-duty bulldozer attachment.

The specifications require the separation of the sand from the gravel, and the classification of the gravel into four intermediate sizes by screens having ¾-in. square, 1½-in. square and 3-in. square, or equivalent, openings. The separation of the gravel into the several sizes and handling it must be such that the amount of undersize material by weight at the time of batching will not exceed 18 per cent. for cobbles and 10 per cent. for fine gravel. The sand was required to be graded so that the fineness modulus would not be less than 2.50 nor more than 3.00.

A screening-and-washing plant was designed to meet these requirements and furnished to the contractors by Garlinghouse Bros. of Los Angeles, Cal. The plant was erected by the general contractors. As a basis for the design there was available the average pit-run grading of the field deposits, determined from test pits that were explored by the bureau in preliminary investigations. A complete description of the plant, as originally built, follows.

Aggregate is brought from the raw storage piles by the 12-cu.yd. Carryall, and dropped over a grizzly into a receiving hopper. It is then taken by a Link-Belt variable-speed reciprocating-plate feeder, 30 in. wide by 5 ft. long, to a 30-in. Link-Belt belt-conveyor 130



The sand-and-gravel plant at Seminoe Dam.

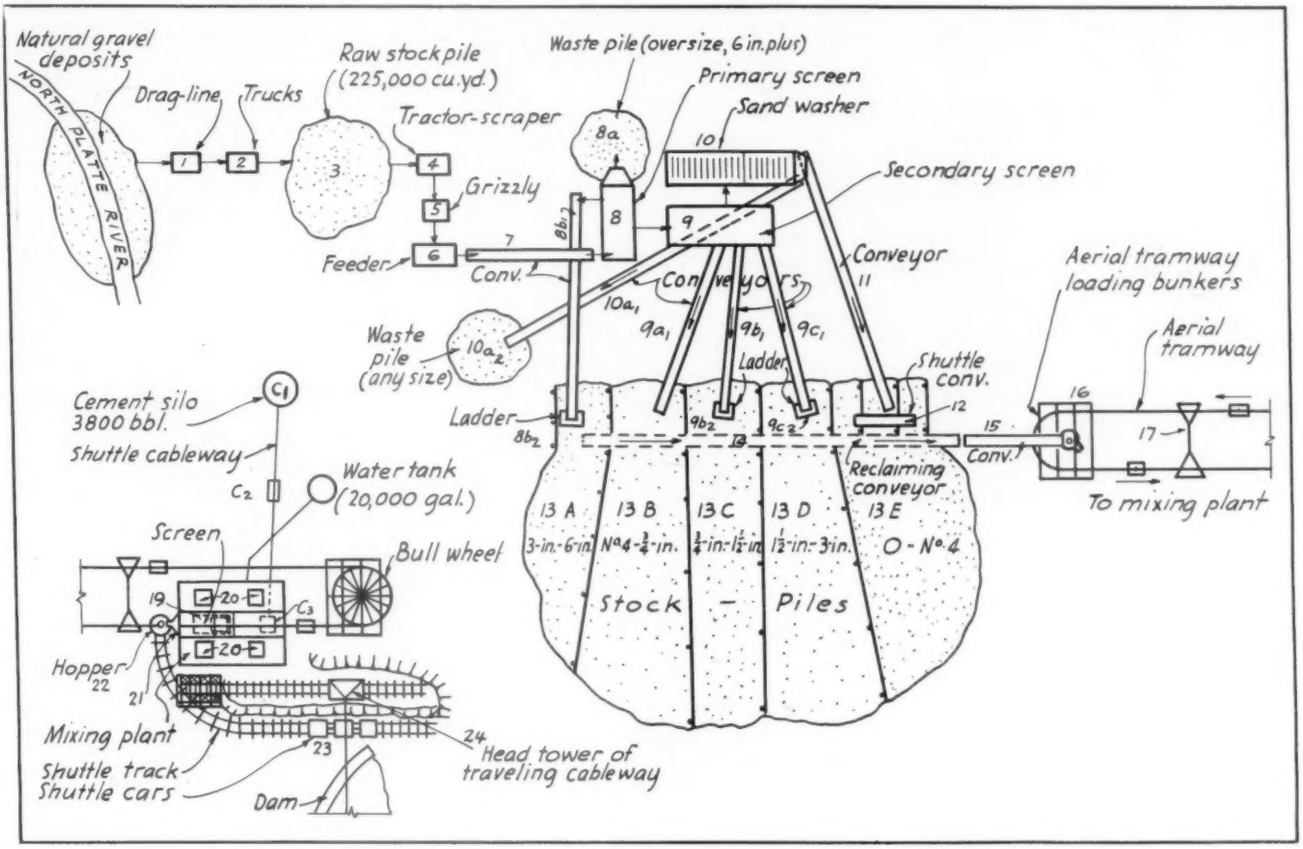
Control house, screens and sand-drag at the sand-washer.

View showing character of the gravel deposit in the river bed. Drag-line at work in center.

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE AGGREGATES AND CONCRETE PLANTS, U. S. BUREAU OF RECLAMATION, SEMINOE DAM, WYOMING.

(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key	Equipment	Make	Type, Model, Size or Capacity	Power Source
Excavating, loading and storing	1	Drag-line	Northwest	1½-cu. yd.	
	2	Trucks (5)	International	8-cu. yd. (3) and 12-cu. yd. (2), end-dump bodies	
	3	Stock-pile		225,000 cu. yd. approx.	
Reclaiming and hauling	4	Tractor	Caterpillar	D-8 Diesel	
		Scraper	Le Trouneau	Carryall, 12-cu. yd.	
	5	Grizzly			
	6	Feeder	Link-Belt	Reciprocating-plate, DM 20	5-hp. Westinghouse motor
	7	Conveyor	Link-Belt	30-in. belt, 130-ft. centers	20-hp. G.E. motor
Primary screening and washing	8	Screen (Over 6-in. to 8a: 3-in. to 6-in. to 8b.; under 3-in. to 9)	Garlinghouse	Revolving, 4-ft. by 18-ft., 8½-ft. scrubber section	20-hp. G.E. motor
	8a	(Over 6-in. from 8) Waste (cobbles)			
	$8b_1$	(3-in. to 6-in. from 8) Conveyor	Link-Belt	18-in. belt, 20-ft. centers	3-hp. Westinghouse motor
	$8b_2$	Ladder (To 13A)			
Secondary screening, washing and conveying	9	(Under 3-in. from 8) Screen (No. 4 to ¾-in. to $9a_1$; ¾-in. to 1½-in. to $9b_1$; 1½ in. to 3-in. to $9c_1$; sand to 10)	Garlinghouse	Revolving, 46½-in. by 15-ft.	
	$9a_1$	(No. 4 to ¾-in. from 9) Conveyor (To 13B)	Link-Belt	18-in. belt, 65-ft. centers	3-hp. Westinghouse motor
	$9b_1$	(¾-in. to 1½-in. from 9) Conveyor	Link-Belt	18-in. belt, 65-ft. centers	3-hp. Westinghouse motor
	$9b_2$	Ladder (To 13c)			
	$9c_1$	(1½-in. to 3-in. from 9) Conveyor	Link-Belt	18-in. belt, 65-ft. centers	3-hp. Westinghouse motor
	$9c_2$	Ladder (To 13D)			
	10	(Sand from 9) Washer (Waste to 10a; sand to 11)	Link-Belt	Double-chain drag	7½-hp. Westinghouse motor
	10a	Waste			
	11	Conveyor	Link-Belt	18-in. belt, 80-ft. centers	5-hp. Westinghouse motor
	12	Conveyor (To 13E)	Link-Belt	18-in. belt, 18-ft. centers	3-hp. U.S. Syncro-gear motor
Storage, reclaiming and transportation to concrete plant	13A	(From $8b_2$) Stock-pile (3-in. to 6-in.) (From $9a_1$)			
	13B	Stock-pile (No. 4 to ¾-in.) (From $9b_2$)			
	13C	Stock-pile (¾-in. to 1½-in.) (From $9c_2$)			
	13D	Stock-pile (1½-in. to 3-in.) (From 12)			
	13E	Stock-pile (Sand)			
	14	Conveyor	Link-Belt	24-in. belt, 130-ft. centers	7½-hp. Westinghouse motor
	15	Conveyor	Link-Belt	24-in. belt, 215-ft. centers	25-hp. Westinghouse motor
	16	Tramway loading bunkers			
	17	Tramway buckets (67)		2.4 mi. long, 136 tons per hr.	75-hp. G.E. motor
Concrete plant	18	Hopper (Gravel to 19, sand to 20B) (Gravel from 18)			
	19	Screen	Symons	Vibrating, 3-deck, 4-ft. by 8-ft.	7½-hp. Westinghouse motor
	20(A)	Gravel bins (4) (To 21) (Sand from 18)			
	20(B)	Sand bins (To 21)			
	C 1	Cement Silo		Steel, 30-ft. diam., 50 ft. high; 3,800 bbl.	
	C 2	Cableway			
	C 3	Cement bin			
	C 4	Feeder	Blaw-Knox		
	C 5	Conveyor	Blaw-Knox	Screw	
	C 6	Batching hopper (To aggregate flow entering 21)	Blaw-Knox		
		(Gravel from 20A; sand from 20B; cement from C6)			
	21	Mixer	Davis	Tilting, 4-cu. yd.	75-hp. G.E. motor
	22	Hopper		Circular, cone-type	
	23	Bruckets		4-cu. yd.	
		Cars		Flat	
		Locomotive	Plymouth	8-ton, gasoline	
	24	Cableway			



Flow-sheet of aggregates and concrete-mixing plants at Seminoe Dam.

ft. long, which elevates the aggregate to the primary screening and washing trommel. The feeder and the field-conveyor belt are driven by 5-hp. Westinghouse and 20-hp. G.E. motors, respectively. The first wash water is introduced at this screen through a 3-in. pipe, the flow entering with the ribbon of aggregate. The Garlinghouse primary screen is 4 ft. in diameter and 18 ft. long, with an 8½-ft. scrubber section, a 4-ft. section of 3-in. square openings, a 3½-ft. section of 6-in. square openings, and a 2-ft. plain section. The screen is inclined on a slope of ⅞ in. in 12 in. and is driven by a 20-hp. G.E. motor. In addition to the wash water, which enters with the aggregate, another 3-in. jet of water enters the trommel from the opposite end and intersects the flow of aggregate midway in the 3-in. section. This stream of water retards the travel of the aggregate and thereby makes possible more effective screening, as well as a thorough washing of the cobbles. The 3-in. to 6-in. cobbles drop on an 18-in. Link-Belt belt-conveyor which carries them 70 ft. to the finished storage piles. Material under 3 in. in size passes to the Garlinghouse secondary trommel located below the primary screen.

The secondary trommel is a double-drum rotating screen, 46½ in. in diameter and 15 ft. long. The inner drum consists of a washer section 5 ft. long and 10 ft. of perforated steel plate, 7 ft. of ¾-in. and 3 ft. of 1½-in. square openings. The outer drum or sand jacket is a perforated steel-plate screen 72 in. in diameter and 6 ft. long, with $\frac{3}{16}$-in. square openings. The screen is inclined on a slope of 1⅛ in. in 12 in., rotates at 12 r.p.m. and is driven by a 20-hp. G.E. motor. Aggregate enters the upper end, moves over the ¾-in. section, where aggregate smaller than ¾ in. passes on to the outer drum, and the sand (minus $\frac{3}{16}$-in.) is screened through to the sand washer. Material retained on the sand jacket passes out the end of the outer drum on an 18-in. Link-Belt belt-conveyor on 65-ft. centers and is delivered to storage. Aggregate retained on the ¾-in. screen section passes to the 1½-in. section, where the intermediate size (¾-in. to 1½-in.) is removed, while material larger than 1½ in. moves out the end of the trommel. Two 18-in. Link-Belt belt-conveyors of 65-ft. length, suitably located and driven by 3-hp. Westinghouse motors, convey the different sizes to the finished storage piles. In addition to the wash water entering this screen from the primary screen, a 3-in. jet of water is directed on the aggregate as it passes through the ¾-in. section. Another 18-in. Link-Belt conveyor belt 65 ft. long, driven by a 5-hp. Westinghouse motor and located below the secondary screen, is available for wasting any size material, except cobbles, to a near pile.

The screens, as above described, were not sufficient to produce cleanly-separated aggregate which would meet the specification requirements, and it was necessary to resort to oversize screens in order to eliminate excessive undersize material. The following oversize screens were substituted in the secondary screen:

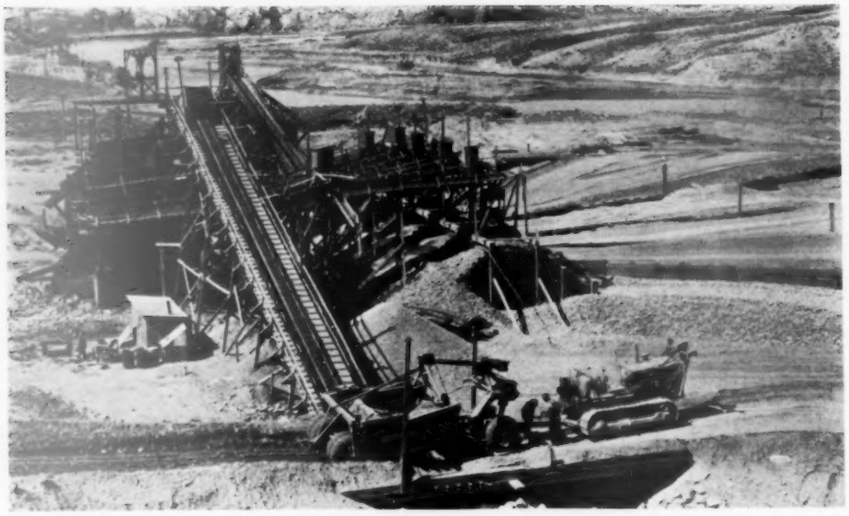
For the ¾-in. square screen a ⅞-in. square screen.

For the 1½-in. square screen a 1⅝-in. square screen.

For the $\frac{3}{16}$-in. square screen a $\frac{3}{16}$-in. by 1-in. slotted screen.

These screens reduced the undersize material to satisfactory limits and the quantity of oversize was negligible.

The sand passes from the secondary screen to the Link-Belt sand-washer, which is of the double-chain drag type, with flights 39 in. wide. Variable quantities of water are admitted as desired and the sand grading can be controlled to some extent in this manner. The drags are driven by a 7½-hp. Westinghouse motor and travel at the rate of 12 ft. per min. The sand as it comes from the sand-washer drops on an 18-in. Link-Belt conveyor belt 80 ft. long whence it goes to an 18-in. Link-Belt shuttle conveyor 18 ft. long, which pro-



Another view of the sand-and-gravel plant. Tractor and scraper with a load in foreground.

vides means for storing in any one of three sand piles. A 5-hp. Westinghouse motor drives the long conveyor and a 3-hp. U.S. Syncrogear motor the shuttle conveyor.

Rock ladders are mounted at the ends of the intermediate, coarse, and cobble conveyor belts to reduce breakage as the rocks drop to the storage piles. Aggregates are moved to the finished storage piles by a Bagley scraper mounted on a 10-ton Mack truck for convenient servicing at each pile. The Caterpillar tractor with a special attachment is sometimes used to drag material out of the storage piles.

A timber reclaiming tunnel, 6 ft. by 7 ft., is located under the finished stock-piles. It is equipped with manually-operated radial gates, two for each size of gravel, and two for each of the sand bins. The gates under the sand piles are operated so as to maintain an approximately uniform moisture content. The aggregate is discharged direct to a Link-Belt 24-in. reclaiming belt 130 ft. long, feeding a 24-in., 215-ft. inclined conveyor of the same make, which elevates the aggregate to the aërial-tramway loading bunkers. These conveyors are driven by 7½-hp. and 25-hp. Westinghouse motors, respectively.

The water for the plant is pumped from a sump near the river by two Worthington single-stage centrifugal pumps operating in series, furnishing 1,200 gal. per min. against a 50-ft. head.

A coal boiler provides steam for thawing frozen aggregate in the stock-piles by means of an embedded circulating-pipe system under the stock-piles and immediately above the reclaiming tunnel.

Aggregate is transported from the gravel plant to the mixing plant by means of an aërial tramway. The tramline is 2.4 mi. long and travels in a straight line from the processing plant to the mixing plant. It rises 680 ft. over a ridge and then drops 43-ft. to the mixing plant, the net rise being 246 ft.

The tramline is suspended by twenty towers, between which the maximum span is 1,500 ft., and carries 67 32-cu.ft. buckets, which ride over a 1⅝-in. lock-coil cable when loaded, and return empty over a 1-in. lock-coil cable. The buckets are clamped and unclamped automatically to the 1-in.-diameter load line. They are automatically dispatched from the No. 1 tower, which is at the loading bunkers, one bucket to every 397 ft. of cable. As the buckets are dispatched they are automatically fastened to the endless cable by means of friction grips, that are designed to hold 4,000 lb. The buckets travel at 544 ft. per min. and make a round trip in 48½ min., making the capacity of the tramway 130 tons per hr. The endless cable is driven by a 75-hp. G.E. motor. Each bucket is wedge-shaped and has a swing gate in its bottom. Upon reaching the mixing plant the gate lock is automatically tripped and the aggregate drops into a receiving hopper. The buckets then travel 49 ft. to the end tower, where they turn around on a 16-ft.-diameter bull wheel and pass out on the return cable. As they return to the gravel plant they leave the cable and are pushed by hand around the loading bunkers to be refilled and dispatched again.

Loading bunkers of the aërial tramway.

The breakage of aggregate in handling caused an excessive amount of undersize material in each of the gravel sizes, and to extract this material the contractors installed a Symons 3-deck vibrating screen immediately below the receiving hopper of the aërial tramway. This screen is 4 ft. wide and 8 ft. long. The three decks have screens as follows: 3-in. square punched steel on the top deck, 1⅝-in. square wire mesh on the middle deck, and ⅞-in. wire mesh on the bottom deck. Aggregate is fed to the screen from the hopper above through a regulating slide gate. Sand by-passes the screen on its way to the sand bin. Chutes suitably located at the end of the screen admit the different sizes of gravel to their respective bins. The vibrating screen is driven by a 7½-hp. Westinghouse motor and makes 825 vibrations per min.

The type of cement used in the construction of Seminoe Dam is a modified Portland, manufactured under specifications prepared by the U. S. Bureau of Reclamation. The Monolith Midwest Portland Cement Co., Laramie, Wyo., is the cement contractor. Cement is transported to Parco, Wyo., the nearest railway station, in regulation box-cars, from which it is pumped by a Fuller-Kinyon cement pump into a Blaw-Knox silo of 325-bbl. capacity. From Parco it is trucked to the damsite by two model BX 16-ton Mack and four 6-ton Ford inclosed dump trucks. The cement-storage silo at the dam is located on the top of the canyon walls 330 ft. above the mixing plant. The trucks

Cableway taking concrete bucket from car on shuttle track.

dump into a receiving hopper adjacent to the road. Cement drops through the hopper into a 14-in. Link-Belt screw-conveyor, which carries it 84 ft. to the main storage silo. This silo is of steel construction, 30 ft. in diameter and 50 ft. high, and has a capacity of 3,800 bbl. It has a cone-shaped bottom through which cement is fed to the shuttle-cableway bucket. The shuttle cableway operates between the silo and the mixing plant. Cement is carried in a 4½-bbl. capacity bucket. The screw-conveyor and the cableway are operated by 15-hp. and 25-hp. electric motors, respectively.

Water is supplied to the mixing plant from the river by means of a two-stage Gould pump, driven by a 50-hp. motor at 1,659 r.p.m. The pump de-

Tower and bucket on aërial tramway.

livers 150 g.p.m. against a 360-ft. head, through a 4-in. line 1,600 ft. long to the main storage tank of 20,000-gal. capacity. The water flows therefrom to a heater tank of 2,000-gal. capacity, which is provided with steam-heating coils. The water then is piped through a steam-jacketed line to the mixing plant.

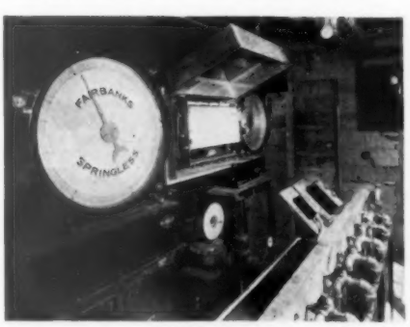
The mixing plant, which is located on the west canyon wall, 400 ft. up a draw from the west abutment, consists chiefly of storage bins, batching equipment and one Davis 4-cu.yd. mixer driven by a 75-hp. G.E. motor. The building is of timber construction, placed on a concrete foundation, and is 36 ft. long, 28 ft. wide and 51 ft. high.

The storage bins include a separate bin of 200 tons capacity for sand and for each of four different gravel sizes and a cement bin of 350 bbl. capacity. The bottoms of the aggregate bins are flat with the draw-down gates located near the center of the building. The bottom of the cement bin is sloped to a Blaw-Knox feeder, which feeds a 6 ft. by 12-in. diameter Blaw-Knox screw-conveyor, inclined 1 ft. in 2½ ft. to the Blaw-Knox cement-batching hopper. The aggregates are fed through air-operated gates to the central cumulative weigh-batcher on the batching floor. The batching hopper is 10 ft. square at the top, 2 ft. square at the bottom, and 5 ft. deep. It is equipped with Fairbanks 16,000-lb. capacity scales, and has an air-controlled discharge gate which discharges into the 4-cu.yd. tilting-drum

Portable pump unloading cement from box-cars to tank truck.

mixer. The cement-batching hopper is located above the aggregate hopper and discharges into the flow of aggregate as the aggregate enters the mixer. It is equipped with Fairbanks-Morse scales of 2,000-lb. capacity, which have an automatic mercury cut-off attachment. The hopper is emptied by an air-controlled gate mounted on its side. Air is supplied by a rubber hose so as not to interfere with the sensitivity of the scales.

Water is measured by a 2-in. Neptune Trident water meter with a special dial head and a Spangler automatic metering and recording unit. The water is batched into a 200-gal. tank, equipped with a calibrated water glass for checking the meter, and is held there until ready to be dumped into the mixer. The batch is dumped manually by a 6-in. Merco Nordstrom quick-acting dump valve, in such a manner that the



Control equipment on the operating floor of the mixing plant.

Loading the 4½-bbl. cement bucket on the shuttle cableway.

water enters before, while, and after all the other ingredients enter.

The consistency meter required by the specifications for indicating concrete consistency is a G.E. recording watt-meter, type CD-13, operating on a 115/230-v. control circuit. It is wired in the power circuit for the motor which drives the mixer and records the power demand of the motor.

A specially designed and constructed combined graph recorder was constructed by the contractors for this plant. It is located between the two scales immediately above the water meter. Connecting arms are attached to the aggregate, cement and water dials, and extend into the recorder, which houses three Bristol No. 925 strip recorders and the consistency meter in such a manner that they all record on a specially printed paper 26 in. wide. The paper is driven by a $\frac{1}{12}$-hp. motor and travels at a speed of 30 in. per hr. or ½ in. per min. A timing device, operated by a Telechron, 60-cycle, electric time clock, stamps the time on the right margin of the paper every 15 min. On this recorder it is possible to read at a glance the weights or measurements of each ingredient that goes into every batch.

Attached to the aggregate scale is an electric contact, located in such a manner that as the dial returns to zero contact is made. This actuates a General Electric timer, type 3TSA 10, that operates a red signal light, which stays illuminated for the period of mixing.

At the end of that time the red light goes off and a white light goes on, indicating that the mixing time has passed. In connection also with the timing device is a batch meter which records the number of batches mixed.

Adjacent to the control room is an

(Continued on page 60)

RIGHT—One of the 6-cyl. Diesel engines in one of the new dump trucks. BELOW —A typical Diesel-engine installation in one of the old trucks.

Diesels Supply Low-Cost Power for 191 Busy Trucks in Colonial Fleet

THE Colonial Sand & Stone Co., Inc. of New York, N. Y., has nearly completed the truck Dieselization program which was first announced to the industry in the September, 1938 issue of PIT AND QUARRY. As part of this program 62 old trucks with gasoline engines were converted to Diesels. Seventy-seven new Mack trucks with Cummins Diesel engines were also ordered and all except a few of these have been delivered and are now in operation. Since the original order was placed 52 more Cummins Diesel engines for replacement purposes have been ordered. When this program is completed the company will have a fleet of 302 trucks, of which 191 will be Diesel-powered, forming the largest fleet of Diesel-powered trucks in the world. Of this total, 62 trucks will be used for ready-mixed-concrete delivery, 13 for lime-putty and mortar delivery, and the remainder for delivering other materials, including sand and gravel, crushed stone, cinders, slag, grit, etc.

In order to maintain and service its huge fleet properly the company has developed a system of service and repairs which operates on the hourly instead of the mileage basis. This system has resulted in important economies and is described later in this article.

The first step in this mass Dieselization program dates back to December, 1937, when a Cummins 6-cyl. Diesel engine was installed in an old Mack Model AC truck and a 4-cyl. engine was installed in an old Pierce-Arrow truck. Air brakes and heavier transmissions were installed because of the increased power and speed. One of these trucks has now been driven 20,000 mi. and neither of them has given any trouble of any kind. Both have shown great savings on fuel cost and have speeded up deliveries. The excellent results obtained with these test installations made the company decide to go ahead with this program.

Fifty old Mack Model AC trucks have now been converted to Diesel power by the installation of Cummins engines, all but one being 4-cyl. Type H engines. No material alterations were necessary in making this change other than the installation of air brakes necessary because of the trucks' greater speed. Of these trucks 21 are used for ready-mixed-concrete delivery, 18 for material delivery and 11 for delivering mortar and lime putty. One of the mortar trucks carries a special Uniflow mortar-mixer body which has separate compartments for cement, lime putty and sand and can mix any desired combination of these at any one or several jobs on one trip. This truck, invented and patented by Durando Miller, vice-president in charge of the Mortar Division of the company, was completely described in the October, 1937 issue of PIT AND QUARRY, which carried an article describing the new lime-putty and mortar plant at the company's yard in Astoria, L. I.

One of these Diesel trucks has been converted for the delivery of lime-putty or mortar in containers. A flat body with a Gar Wood swing-boom hoist has been installed. This carries eight 1-cu. yd. steel containers which can be delivered on one trip to several jobs as needed. This is thought to be the first

use of this type of container for truck delivery of lime-putty or mortar in this territory.

These converted trucks are now being used in sections of Greater New York where traffic is not excessively heavy and where comparatively long hauls predominate. Most of them are used in the Bronx, Westchester, Queens, Nassau County, etc., where many of the hauls are from 6 to 15 mi. long. High sustained speeds are important in these sections and these Diesel trucks, with a top speed of 32 mi. per hr. and better torque characteristics, have shown considerable savings in hauling time over their former records with gasoline engines which gave them a top speed of only 22 mi. per hr. An example is a 28-mi. round trip which took 3¼ hr. with gasoline-powered trucks and is now made in 2½ hr. with the same Diesel-powered trucks.

Of the new 77 trucks 49 are Mack Model FK machines with extra-heavy, double-frame chassis having tubular cross members. These trucks have shock absorbers on their front ends and torsional stabilizers on their rear ends. They are governed to a top speed of 38 mi. per hr. and have ample braking surface for this speed. Westinghouse brakes and air-compressors are used. Extra-heavy single-axle drives and transmissions are used with dual 13.50-in. by 24-in. Goodyear tires on the rear and 11.25-in. by 24-in. Goodyear tires on the front wheels. Goodyear rims are also used. Webb 8-spoke steel wheels are used on the rear as these reduce the torque and make possible the use of a double-bevel type of rim.

The Cummins Model H 6-cyl. Diesel engines used in these trucks are of simplified design, the only major item of maintenance being the fuel pumps. All are equipped with De Luxe oil-filters and dual air-cleaners and electric starting-and-lighting systems. Tachometers are used to show the speeds in r.p.m. at which the engines are operating and these have red hands which remain at any maximum attained speed above a predetermined limit and can only be set back at the yard with a key. This prevents abuse of the engines.

Each of these trucks is equipped with a Gar Wood 14-cu. yd. steel dump body with a 1-piece tail-gate and a Wood outside-mounted telescopic hydraulic hoist with an integral oil-storage tank. These trucks are to be used for the delivery of sand and gravel, stone, cinders, etc. By November 12, 43 of these 14-cu. yd trucks had been delivered.

Five of the new trucks, also to be used for delivery purposes, are Mack Model FK 6-wheel units with Mack dual rear-axle drives. These also have Cummins Model H 6-cyl. Diesel engines and the same equipment as the

First unit of the new 14-cu.yd. Diesel-powered trucks delivered in October.

One of the converted Diesels dumping sand and gravel into hopper at the Bayside plant.

One of the special trucks used for making deliveries of mortar. It is also now Diesel-powered.

Special type of 8-cu.yd. mortar-mixing truck which has likewise been changed over to Diesel power.

Another of the conversions is this ready-mixed-concrete truck equipped with an old mixer body.

above-described trucks except that Heil 16-cu. yd. steel dump bodies and Heil telescopic side hoists are used. Ten 11.25-in. by 24-in. Pennsylvania tires and Firestone rims are used on each of these trucks.

Of the remaining 23 new trucks 13 are Mack Model FH heavy-duty units with chassis specially designed for 5-cu. yd. Transit Mixer Co. concrete-mixer bodies. These trucks have Cummins Model H 4-cyl. Diesel engines and the same equipment as the other new trucks. They have four wheels with 12.00-in. by 24-in. General tires on the dual rear wheels and 10.50-in. by 24-in. General tires on the front wheels. Six-spoke wheels with Firestone single-bevel rims are used.

The other 10 new trucks are Model FH Macks with 6-cyl. Mack Diesel engines and 5-cu. yd. Jaeger truck-mixers.

By next spring the company expects to have 90 per cent. of its 302 trucks equipped with Diesel engines.

According to Anthony Pope, a vice-president of the company, and son of its president, Generoso Pope, the converted Diesel trucks are averaging about twice as many miles per gallon of fuel as gasoline trucks of the same make and size. No. 2 fuel oil, costing only half as much per gallon as gasoline, is used. All the Diesel engines used are equipped with a new type of smokeless injector which insures complete combustion of the fuel. This engine has been approved by the Port of New York Authority and these trucks are permitted to operate in the Holland and Lincoln tunnels, where engines emitting excessive fumes are barred.

Producers operating their own trucks will also be interested in the company's methods of truck maintenance which are considerably in advance of ordinary practice. This work is done under the direction of T. S. McGlynn, fleet-maintenance superintendent and Dave Pasquariello, who has charge of tire, rim, wheel and axle maintenance. Repair shops are maintained at various branches under the supervision of expert foremen and there are garages at 16 of the company's 25 yards, from New Rochelle down to Manhattan and out on Long Island to Port Jefferson. A main stock-room at 141st St. and Grand Concourse supplies all the branches.

After extensive experimentation the company on June 1 put into force a system of service and repairs on an hourly basis instead of the mileage basis which was formerly used. This was found necessary because of the many variables which enter into the former system, making it impossible to set up any definite schedule for such work. For instance, when waiting at jobs, the engines idle for varying periods and on

Shovel loading a Diesel-powered dump truck in the company's pit at Bayside, Long Island.

concrete mixer trucks, most of which have power takeoffs to rotate the drums, the engines run for varying periods to rotate the mixer on the way to the job or at the job, when the truck is standing still.

There is a card file with individual cards for each truck. All the records, including hours worked daily and all factors having a bearing on the condition of the truck, are entered on these cards. By analyzing the records for each truck it is possible to determine its condition and the proper intervals for oil changes, greasing and other services. The trucks are also sent to the garages at predetermined intervals for various check-ups, which are made to prevent, as far as possible, unexpected delays for repairs and replacements.

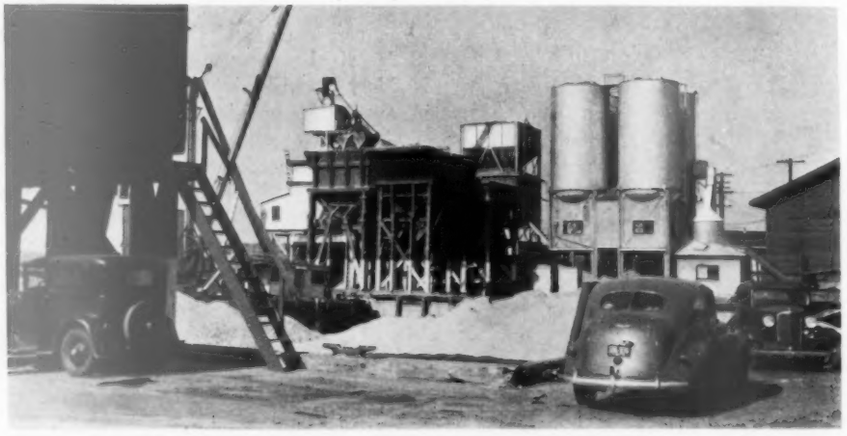
Since this system has been put into effect, according to Mr. McGlynn, maintenance costs have been reduced about one-third. There are also fewer delays due to the necessity for unexpected repairs, which are now usually caught when the trucks are checked over and before serious wear has taken place.

According to Mr. Pasquariello, the secret of long tire life is in correct tire pressure, proper alignment, and the use of the correct sizes of rims. Observance of these fundamental principles has made possible a life expectancy of 40,000 mi. for the 13.50-in. by 24-in. tires used on most of the delivery trucks operated by the company. Through long experience it has been found that the hourly basis is also the logical one to use for tires on this type of work. The average truck operated by the company is driven 20,000 mi. per year, which means that tires last about two years. It has been found that the tires on individual trucks which stand idle much of the time and whose total yearly mileage is considerably less than the average also wear out in about two years due to deterioration of the rubber. Complete records of the performance of each individual tire are kept on file.

The results of the company's methodical and careful system of checking each truck are evident from the records that have been made with older gasoline-powered trucks. Six Model AC Mack trucks with 14-cu. yd. bodies have been used for sand-and-gravel deliveries for many years. Some of these have been driven 100,000 mi. with only minor maintenance expense on the engines, such as carbon removal and valve grinding. These trucks still have their original brake linings, which have been shimmed up with blocks. The company's fleet of gasoline trucks also includes one Dodge, 10 Sterling, 12 Ward La France, 4 Autocar, 2 White, 14 Ford, six 6-cyl. Model AK Mack and six 4-cyl. Model AK Mack trucks. There are also 130 Pierce-Arrow trucks from 14 to 16 years old, which are being retired from service as the new trucks go into service.

The company also stresses the importance of safety in all its operations. A safety expert in the company's employ regularly visits the various yards and plants and inspects them. Regular safety meetings are held.

The Colonial Sand & Stone Co. was incorporated in 1912 to deal in coal and has since expanded its field and operations until it is now one of the largest producers of ready-mixed concrete and lime putty and also one of the largest distributors of aggregates in the East. Twenty-five yards and plants are now operated by the company. In 1931 the sand-and-gravel producing plants of the Goodwin-Gallagher Sand & Gravel Co. were acquired, making the company one of the leading sand-and-gravel producers in this country. This business is now operated as the Metropolitan Sand & Gravel Corp. Under its own name the Colonial Sand & Stone Co. operates a sand-and-gravel plant at Bayside, L. I., which was recently enlarged to a capacity of 300 cu.yd. per hr.



The yard at Astoria showing one of the ready-mixed-concrete plants and the aging tanks of the lime-putty and mixed-mortar plant.

Seminoe *(from page 57)*

insulated room for government inspectors where routine tests are made.

Below the operators' floor is located the 4-cu.yd. tilting mixer, powered by a General Electric 75-hp. motor. The mixer makes 11 r.p.m. and meets government inspection for efficient mixing action. The mixer discharges into a circular cone type hopper, which in turn discharges into the 4-cu.yd. rectangular-bottom dump buckets. Two buckets are set on flat cars, drawn by a Plymouth gasoline 8-ton locomotive, operating on a shuttle track between the mixing plant and the cableway. The 12-ton traveling cableway picks up the buckets and can place them at any desired spot on the dam proper.

Seminoe Dam is being constructed by the U. S. Bureau of Reclamation, of which John C. Page is commissioner. All the engineering and construction of the bureau is supervised by R. F. Walter, chief engineer, S. O. Harper, assistant chief engineer, and J. L. Savage, chief designing engineer, located at Denver, Colo. H. W. Bashore, with headquarters at Casper, Wyo., is construction engineer for the Kendrick project. J. H. Warner is resident engineer at the dam and the writer is concrete engineer.

Discuss Air-Hygiene Topics at Mellon Institute Meeting

MORE than 200 executives from 101 industrial concerns attended the third annual fall meeting of Air Hygiene Foundation held at Mellon Institute, Pittsburgh, on November 17. The executives heard reports on the latest advances in protecting the health of industrial workmen who lose an estimated 200,000,000 working days yearly because of illness. A dozen state and Federal agencies sent special representatives to the meeting.

Reports covered engineering and medical developments during the past year toward employee health improvement, state codes governing health hazards, legal and economic trends. In addition to the technical discussions, speakers stressed the broad benefits for management, labor and the community resulting from this collective effort by employers toward improving health in industry.

One of the speakers, Dr. Willard E. Hotchkiss, Maurice Falk Professor of Social Relations at Carnegie Institute of Technology and former president of Armour Institute, said, "A competent authority find that an estimated 200,000,000 working days are lost annually on account of illness and it is calculated that this runs into hundreds of millions of dollars. The question arises, 'What does this cost?' There are about 15,000,000 people in the heavy industries in this country. If you assume there are four dependents for each industrial employee you will get 60,000,000 people who are affected when a day's work is lost by illness."

Cost items are not completed when you get lost time, Dr. Hotchkiss stated, adding there is also impaired efficiency, labor turnover, disrupted operating schedules, particularly in continuous-process operations, and the cost of training a new employee and placing a substitute in a job. In addition to the costs and hardships borne by the employee himself, ultimately we pay the big cost in our taxes. "The only question about the future of a problem like this," he continued, "is whether it is going to be handled sanely and constructively, and in a consecutive way based on science, or whether it is going to be handled emotionally and restrictively and unintelligently."

T. F. Hatch, New York State Division of Industrial Hygiene and a member of the Preventive Engineering Committee, discussed *State Codes for Control of Industrial Health*. "Code requirements of a state never quite catch up with the standards established in the best industrial establishments," he declared. "It is estimated that less than 10 per cent. of the progress in accident prevention in industry can be credited to mechanical contrivances such as you would put in a code, and that better than 90 per cent. is the result of intelligent management. It is the same story here."

Dr. Leroy U. Gardner, director, Saranac (N. Y.) Laboratory, reported findings in a study of "mixed" dusts and "protector" dusts which he is conducting under a grant from the Foundation. His investigations show that the mixing of inert dust with quartz seems to retard incidence to silicosis. While many substances may act as inhibitors, not all of them are equally effective. When the proportion of silica reaches 50 per cent. or more of the mixture, prolonged contact with the tissues may ultimately cause fibrosis. Early observations of metallic aluminum and the hydroxides of aluminum and iron indicate that each of these substances may be more potent in protective effects than numerous other minerals examined in the tests. Dr. Gardner cautioned that observations over much longer periods than those reported will be required before positive conclusions may be drawn.

He said, however:

"The data suggest that analysis of the rock being worked does not necessarily constitute a measure of the silica hazard in a particular industry. When more evidence has been analyzed it may be found practical to use the proportion of silica in the atmosphere as the basis of states codes. It is hoped that the modifying influences of other dusts may also be established upon a practical basis.

"The principles involved in these studies probably explain the variations in the rate of development of silicosis in different industries. Ultimately they may make it possible to neutralize the effects of silica upon the body. At the present time their influence is not sufficiently understood to be used in this manner. In the speaker's opinion the major objective in the campaign against silicosis is still the elimination of silica dust from the working atmosphere."

Speaking on *Industrial and Public Relations Aspects of Industrial Health*, V. P. Ahearn, executive secretary, National Sand & Gravel Assn. and National Industrial Sand Assn., said in part:

"Attention has been focused on the need of steady employment at higher wages, but the government generally has recently manifested a much larger interest—that of public health. This particular adventure has been the cause of excited comment, but there can be no disputing the fact that the public as a whole has been aroused to the consciousness of the primary importance of health.

"A steady job, decent hours with good pay, is no longer the sole criterion. To that must be added industrial health. It is often characteristic of government that when it swings with the pendulum, it swings too far and thus aggravates rather than cures. Unwise occupational-disease laws have been written, but who can deny that there is an irresistible trend toward the enactment of such laws in every state? Those laws are responsive to the apprehension of employees about health hazards in industry. Industry will do well if it recognizes that fact and meets it intelligently.

"This question of industrial health is not the single problem of a single industry. Neither is it an emotional nor sentimental problem. It is a practical problem for industry as a whole to solve. Statutes of themselves will not provide industrial health. As in the case of industrial accidents, industry has always shown a capacity, once it recognizes and confronts a problem realistically, to make steady progress toward its solution. Air Hygiene Foundation presents a useful vehicle through which industry can pool its forces in eliminating or controlling hazards to health in industry. The necessary work can be done more effectively and economically.

"Nothing is to be gained from a failure to appreciate that either voluntarily or involuntarily health hazards in industry must be reduced. That problem did not bear down on us so heavily in past years, but it is here to-day to stay. Management, according to Lewis Brown, president of Johns-Manville Corp., must hereafter be interpreted in terms of its contribution to improving the lot of the common man, to providing an increased well-being for the ordinary wage-earner and his family. An inescapable part of this is health in industry. In this undertaking there must be a mutual spirit of tolerance."

Theodore C. Waters of Baltimore, chairman, Maryland Occupational Diseases Commission and member of the Foundation's Legal Committee, analyzed present legal trends as follows:

"Twenty-one states have laws compensating disabilities arising from occupational diseases and, as we look forward to the 40-odd legislative sessions of 1939, there will undoubtedly be additional states enacting laws providing

(Continued on page 63)

By YGNACIO SOTO
General Manager,
Cemento Portland Nacional, S. A.

CEMENT PLANT IN MEXICO IS ENLARGED

General view of the plant after the recent improvements had been completed.

View showing the kiln, slurry tanks, clinker pit and clinker pile.

New flat storage warehouse for sacked cement, silos, and power-house.

CEMENTO PORTLAND NACIONAL, S.A. originally constructed its plant at Hermosillo, Mexico, because of the assurance then given that the Yaqui Dam would be constructed about the time when the plant would be ready for production. The dam's construction, however, was not started until a year and a half ago, when President Cardenas promised to have the dam completed before he went out of office in 1940. Construction was begun immediately thereafter. The contract calls for the delivery of about 300,000 bbl. of low-heat cement. With this order and the ordinary commercial demands, which have considerably increased within the last two years, it will be possible for the plant to operate regularly, which had not been the case with the commercial demand alone. The market within reach of Cemento Portland Nacional includes the west coast of Mexico as far as the State of Nayarit and the southern part of Lower California. Deliveries to the dam began on June 1.

Improvements and extensions have been made to make possible the manufacture and storage of large quantities of cement for government and private work, particularly for dams now under construction and others projected.

The MacDonald Engineering Co. of California was engaged to design and construct new buildings and to make repairs and improvements to existing structures and equipment. It was the original designer and contractor for its construction in 1930.

New quarry-development work carried on by the cement company's forces includes the opening of a large glory hole so that the limestone and decomposed granite for the cement mix can be delivered through gates over a tunnel to dump trucks, three of which are now used to transport the materials to the plant crushers.

The crushing-plant equipment and grinding mills, originally furnished by the Traylor Engineering & Mfg. Co., were completely overhauled. Two new concrete slurry tanks were constructed, bringing the total to six. The machine-shop building was moved to a new location to provide for additional open-clinker storage space.

A new compressor building was constructed of cement brick manufactured at the plant. The laboratory was in-

creased in size and new and modern equipment installed, including a compression testing machine made by the Tinius Olsen Testing Machine Co.

A new office building was constructed of concrete with cement-tile roof.

Four additional cement-storage silos were constructed, 18 ft. in inside diameter by 80¾ ft. in height, increasing the plant storage capacity by 20,000 bbl. of finished cement.

A flat storage warehouse, 36 ft. by 132 ft., was constructed to accommodate the storage of cement in bags in compliance with a request of the federal government's testing laboratories. This building is of concrete and masonry to the car-floor level and of wood covered with corrugated steel above.

Dump truck being loaded in tunnel beneath glory hole.

New electrical equipment consisting of motors and motor reducers was furnished by the Westinghouse Electric & Mfg. Co. All the transmission machinery and equipment was made by the Link Belt Co., and the reinforcing steel and grinding balls by the Sheffield Steel Co.

New Haulage System Speeds Up Operations

Strip-hauling costs can be cut in halves by a new, larger and faster materials-moving unit for mines and quarries known as the Tournapull, according to time studies made by an Alpha Cement Co. engineer at its LaSalle, Ill., pit.

The company has been doing its stripping in the usual manner. An old 1¾-cu.yd. shovel scooped the overburden into a number of 4-cu.yd. side-dump cars which were hauled away by small, narrow-gage, locomotives. Each of the two trains has 16 cars. This method requires two men for the shovel, two on each train, and a track crew of five men, or, in other words, a total of eleven men for the entire operation. Their stripping costs and method were those of the average pit.

Shovel loading the trailer in the LaSalle, Ill., pit.

But, still, when the huge Tournapull powering a 30-cu.yd. Tournatrailer rolled into the gravel pit, production increased immediately and operating costs were cut to less than half. The one Tournapull, loaded by the shovel, moved more dirt per hour than both of the trains were able to do together over the same haul. Twelve heaped scoops of the shovel were needed to fill the big bowl of the trailer. This gave an average of 19 pay yards of dirt per load. Inspite of its size and work output, this massive unit is operated by only one man—eight fewer than were required by the railway method.

After checking his time study, the engineer of the Alpha Cement Co. stated, "My figures show that your unit is hauling dirt for an out-of-pocket cost of less than half of our present method." Engineers estimate that two Tournapulls could keep the shovel busy most of the time and *lower* out-of-pocket stripping cost some 20 per cent. below the cost of one Tournapull.

Air Hygiene *(from page 61)*

some form of compensation. The laws already enacted have given rise to various controversial questions affecting the relationship of employers and employees. Their present and future administration will create further problems.

"The subject of time lost by industrial workers because of disabling illness and the economic need for the prevention of such illness, with its attendant financial loss to employees, is of vital importance. Since disabilities caused by those diseases which we call 'occupational' are far less numerous than those caused by the other common ills of life, it is a matter of concern to industrialists to-day that occupational-disease laws should not be administered as general health-insurance laws, to provide compensation for time lost by employees due to common ills.

"It is regrettable that occupational-disease legislation has not been more uniform, although future amendments may tend toward uniformity and remove some of the inequities that now exist. When we analyze the provisions of the law of one state providing compensation for one specific disease and compare these provisions with the law of an adjoining state, we realize that this legislation is still in its infancy and subject to drastic revision.

"The 1939 sessions of the legislatures will enact new laws relating to this subject or amend laws now effective. There are already indications that important amendments to existing laws will be offered. Careful consideration should be given to this legis'ative program. These laws are the result of definite economic need to afford to employees adequate compensation for injuries they have sustained during the course of their employment. At the time of enactment employers were concerned about the additional cost to which they would be subjected, but to date it does not appear that the laws now effective have placed an unjust burden upon industry. It is too early to predict whether or not the administration of the laws presently enacted will be successful, but if they fail to accomplish the purposes for which they are designed, they should fail because of their inherent defects and inequalities, and not because of the attempt by employers to avoid the imposition upon them of costs for compensating injuries resulting from operations to which their employees have been subjected."

The truck hauling a bucketload of rock to the plant.

DETACHABLE BUCKETS SPEED UP WORK AT LIMESTONE QUARRY IN TENNESSEE

The plant of the Buchanan Stone Co. with the Diesel engine in foreground.

THE rapid increase in the demand for agricultural limestone in the last few years has inevitably resulted in an equally rapid growth of facilities for the production of this material. A large part of this new capacity is in the form of small, inexpensive plants, which ship by truck within a limited area. Such a plant was built late in 1937 by the Buchanan Stone Co. near Clarksville, Tenn.

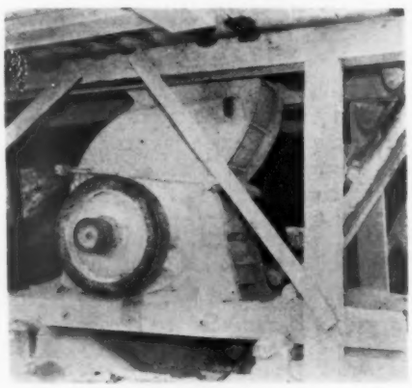
This quarry 4 mi. southeast of Clarksville, has been operated by both the county and the state and was partly developed when taken over by this company. A 65-ft. face has been developed and another 10-ft. level is being opened. Drilling is done in benches with a jackhammer. Stone was formerly loaded by hand into a 1½-cu. yd. dump truck, which hauled it about 400 ft. to the plant. A few months ago this truck was replaced by an International 1½-ton truck on which is mounted a Brooks Load-Lugger bucket. Five 1½-cu. yd. buckets of this type are used with this outfit, and while a full bucket is being hauled to the plant the others are being loaded. Because the top of a bucket is so much lower than the body of the truck and because no time is lost while the truck is making a round trip to the plant, 5 men are now loading as much stone as 10 men formerly handled. The company management says that the Load-Lugger has saved $70 per week in labor cost alone.

The stone is discharged at the plant into a Brooks Day Model MR No. 40 swing-hammer pulverizer, which can be adjusted to produce any size of material from dust to 1½ in. A chain-bucket elevator discharges the crusher product into a 10-ft. long revolving screen, when rock is being produced. In this case the rock, agstone and oversize material are discharged into separate compartments of a wooden bin. The oversize is returned by a truck to the crusher. When producing 1½-in. stone, the plant has a capacity of 150 tons in a 10-hr. day, of which about 20 tons is dust.

When producing agstone only, the plant capacity is about 100 tons in 10 hr. In this case the screen is not used and the product is discharged from the

The new and old haulage systems in this quarry operating side by side.

elevator into all three bin compartments. Trucks are loaded through gates under the bin and shipments are weighed on a Winslow truck scale. An 80-hp. International Diesel engine drives the crusher through a flat belt and the elevator and screen through chains.



The swing-hammer pulverizer which can produce dust or crushed stone.

Sand-and-Gravel Industry Benefits from Growing Construction Volume

The new plant of the Corinth Sand & Gravel Co. showing main conveyor and return elevator from crusher.

THE sand and gravel industry, judging from the expenditures made during the year for new plants and plant improvements, did not let a temporary lull in demand affect its optimism about the future. As a result many of these producers are in a position to take full advantage of the current upswing in business. No extremely large plants were built in 1938, most of the new operations being designed to serve a comparatively small area. Many of the new plants have facilities only for truck shipments. The information on hand concerning new plants either under construction or contemplated and similar information on plant improvements indicates that 1939 expenditures will reach an even higher level.

The Corinth plant from stock-piling conveyor showing screen and gasoline engine.

Judging from the incomplete information available at this time the commercial production of sand and gravel in 1938 dropped little if at all. A survey of the existing and prospective demand, made early in the summer of 1938, supports this statement. A total of 187 representative producers in 40 states reported that business on hand or in sight at that time indicated a 12 per cent. loss for the year. Recent contacts with these and many other producers show that the demand for sand and gravel in the latter part of the year exceeded that expected at the time this survey was made. The present improvement in general business conditions together with the high level of construction indicate that production in 1939 will far exceed that in the preceding year.

An event of great interest and importance to producers of sand and gravel was the opening of the new laboratory of the National Sand & Gravel Assn. This laboratory is located on the campus of the University of Maryland at College Park, Md., about 10 mi. north of Washington. Considerable new testing equipment was purchased, but the important feature of the new arrangement is that it makes possible the conduct of research on a more comprehensive scale.

Many important tests are now under way in this laboratory and the industry will be advised of the progress made on them at the annual convention of the association. Equipment at the laboratory includes two 100,000-lb. compression machines, a 300,000-lb. hydraulic compression machine, a Los Angeles Rattler, a Deval abrasion-testing machine, a constant temperature room, etc. A complete description of this laboratory was published in the December, 1938 issue of PIT AND QUARRY.

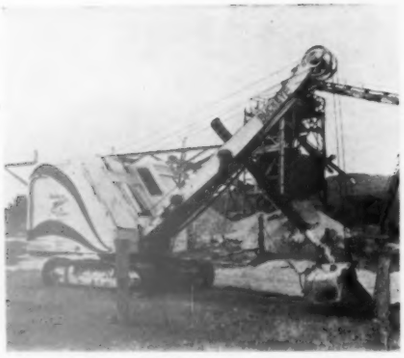
The new sand and gravel plant of the Tuskegee Sand & Gravel Co. near Tuskegee, Ala. is one of the most up-to-date plants in the South and differs from most other plants in this section in securing its materials by dry excavation. A Northwest crane is used for loading and a Plymouth gasoline locomotive hauls cars of material to the plant.

Most of the equipment for this plant was supplied by the Smith Engineering Works, including a feeder, a 4-ft. by 12-ft. vibrating screen, a sand-settling tank, and a 32B gyratory reduction crusher. This plant has a capacity of 100 tons per hr. A new asphalt plant operated by an affiliated company uses most of the production when it operates. Excess production is sold. All equipment units in both plants are electrically driven, power being supplied by a new Fairbanks-Morse 120-hp. Diesel engine driving a 76.8-kw. alternator of the same make.

One of the new plants of the year was that of the Grove Stone & Sand Co., Grovestone, N. C., a company which has been in this business since 1924. This plant has a capacity of 80 tons per hour and was designed by the Universal Crusher Co. which also supplied much of the equipment.

The double-roll crusher in the Corinth plant with gasoline engine which also drives the elevator.

Trucks are used for haulage to the plant. A revolving scrubber precedes a 3-deck Simplicity screen. Oversize goes to a Universal jaw crusher and material retained on the second deck goes



The gasoline shovel used by the Corinth Sand & Gravel Co. at its new plant.

to a Universal double-roll crusher. Products of both crushers are returned through the scrubber. A second Simplicity screen is used for gravel sizing. Sand tanks, Eagle screw washers and a screen are used to grade sand. A new concrete brick plant was also built.

G. Van Decker & Sons, Paterson, N. J., built a new plant designed by the Iowa Mfg. Co. which supplied all the equipment. This plant was sold through the Walton Equipment Co., Inc., New York, N. Y., and has a capacity of 50 cu.yd. per hr. A 6-in. dredge pumps the material to a 42-in. by 15-ft. revolving screen with a 5-ft.

The jaw and roll crusher at the Grove plant. The scrubber, one of the screens and the sand classifiers are at right.

scrubber section and a sand jacket. Sand goes to a 36-in. drag followed by a 42-in. drag. Belt conveyors stockpile the two grades of sand. Gravel and pea gravel are stored in two 35-ton bins.

A new plant was built early in 1938 by the Corinth Sand & Gravel Co., Corinth, N. Y., to supply materials for highway work. All new equipment was installed and the plant is well and compactly designed. A Buckeye Clipper No. 50 gasoline shovel loads trucks at the pit and these discharge into a hopper at the plant which has a bar grizzly to reject oversize. A reciprocating feeder discharges the material on an inclined belt conveyor feeding a 3½-deck Diamond shaker screen equipped with sprays.

Oversize is chuted to a Diamond double-roll crusher from which a Chain Belt elevator returns it to the screen. The sized gravel is discharged into bins. The sand goes to a Telsmith 7-ft. sand tank and then to a bin. Trucks are loaded from the bins. Sand can also be discharged from storage on a stockpiling belt conveyor.

The screen is driven by an Allis-Chalmers gasoline engine which also drives both belt conveyors through a series of chains and shafts. Another Allis-Chalmers gasoline engine drives the crusher and elevator. Water for washing is obtained from a creek several hundred feet away. An Allis-Chalmers gasoline engine drives a 4-in. Fairbanks - Morse centrifugal pump through Gates V-belts. Goodyear conveyor belting is used in this plant.

A new plant with New England equipment was built by the Wright Trucking Co., Danvers, Mass. Stillman H. Rice, New Haven, Conn., built a plant with New England equipment.

George N. Schwartz, Baltimore, Md., built a new plant designed by the Smith Engineering Works. All equipment, including two vibrating screens, is Telsmith. A ½-cu.yd. General shovel and six trucks were also purchased.

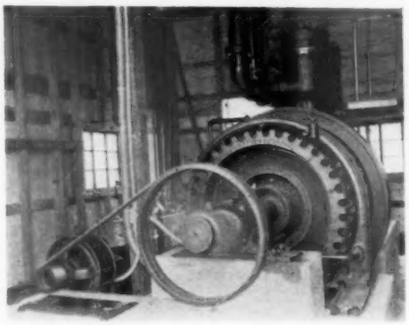
The Lyman-Richey Sand & Gravel Co. built a new plant at Keystone, Nebr. A 200-hp. Cummins Diesel engine was installed. The Montalvo Rock Co. installed a Wheeling jaw crusher at its new plant at Montalvo, Cal.

A new plant costing $50,000 was erected by the Calvert Fuel & Supply Co. at Clarkston, Mich. Two Georgia Iron Works dredge pumps are used in the new plant of the W. C. Scott Sand & Gravel Co., Macon, Ga. The Southern Sand & Gravel Co., Selma, Ala., built a new plant and dredge. A Tyler Niagara screen was installed.

The Shenk Bros. Gravel Co., Durand, Mich., built a new plant. New equipment included a ¾-cu.yd. Bay City shovel and a Simplicity screen. A 110-hp. Buda Diesel engine was installed in the new plant of the John R. Fuel & Supply Co., Utica, Mich. The Hillside Gravel Co., Colorado, Tex., also built a new plant.

Other new plants were built by the Manning Bros. Rock & Sand Co., Irwindale, Cal., Paving Materials, Inc., Jacksonville, Fla., Maertens Co., Grosse Point, Mich., the Logan Sand & Gravel Co., Logan, O., and A. N. Farnham, New Haven, Conn. Screen Equipment Co. "Seco" screens were installed by the Buffalo Sand Co. at Lancaster, N. Y., the Binghamton Crushed Stone & Gravel Corp., Johnson City, N. Y., the Buffalo Gravel Corp., and the Seneca Gravel Co., Buffalo, N. Y.

The Baxter Cartage Co., Detroit, Mich., bought an Iowa Mfg. Co. portable plant. A new Pioneer portable plant was installed by Ray Sablain, Lansing, Mich. The Carolina Sand & Gravel Co., Kathwood, S. C., installed an 8-in.

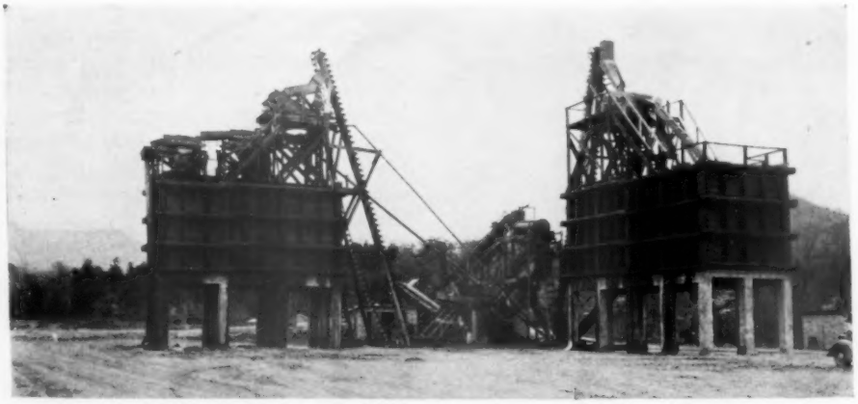


The 120-hp. Diesel engine and alternator which supply power for the new plant of the Tuskegee Sand & Gravel Co.

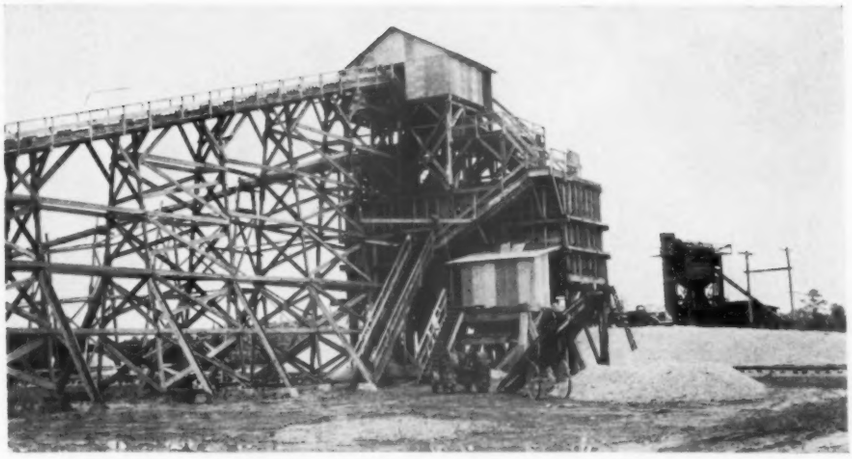
Georgia dredge pump and a McCormick-Deering Diesel engine.

A new Wisconsin Foundry "Badger" portable sand-and-gravel crushing and screening plant was put in operation by the Deppe Lumber & Produce Co., Baraboo, Wis., which also operates a permanent aggregates plant. Incorporated in this plant is a Productive Equipment Co. "Selectro" screen, a roller-bearing jaw crusher, crushing rolls and a Waukesha gasoline engine.

Of outstanding importance as an in-



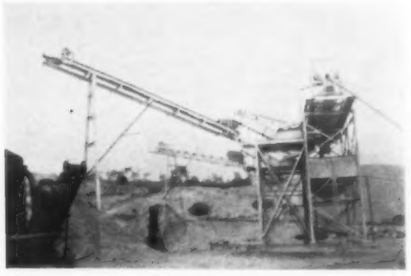
The new plant of the Grove Stone & Sand Co., Grovestone, N. C. Sand and gravel are processed and stored separately in the buildings at left and right, respectively.



The new plant of the Tuskegee Sand & Gravel Co., Tuskegee, Ala. Part of the product is used in the asphalt plant in the background.

dication of progress in haulage practice was the mass Dieselization of a large part of the truck fleet of the Colonial Sand & Stone Co., New York, N. Y. A complete description of this program appears elsewhere in this issue.

Brooks-Wright, Inc., Paterson, N. J., sand and gravel and ready-mixed-concrete producers, replaced a steam shovel used for loading in the pit with a Haiss Model 80 "Bank Special" loader. This machine has extra long and wide crawl-



The new sand plant of G. Van Decker & Sons, Paterson, N. J. A dredge supplies this plant.

ers, guard plates and other special equipment. It is capable of digging 1,000 cu.yd. of material daily from a 50-ft. bank containing cobbles up to 10 in. in size. An older Haiss Model 27 loader is used for loading stockpiled material.

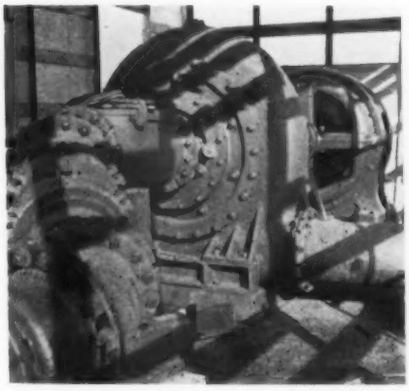
Another novel feature of this plant is the use of Servis recorders to keep a permanent record of operations. One recorder is on the pit loader and the other on the conveyor to the screening building. These recorders, through their psychological effect, have materially increased production and have also made it possible to trace and correct the reasons for recurring delays. A complete description of these operations was published in the September, 1938 issue of PIT AND QUARRY.

The Montgomery Gravel Co., Montgomery, Ala., solved a difficult Federal specification problem at its new plant near that city. The sand in this vicinity is high in certain fractions and low in extreme fines and this condition had to be corrected. This was done by an arrangement of two Nordberg-Wood Auto-Vortex classifiers and two Nordberg-Wood rake-type bowl classifiers. Considerable experimentation was necessary to adjust this equipment to produce a specification sand with the least possible waste. A complete description of this plant and process was published in the August, 1938 issue of PIT AND QUARRY.

John D. Gregg recently installed a new system at his Roscoe, Cal., plant to provide a maximum uniform feed to his plant and to eliminate waste time in the pit. An 800-ton surge hopper and a variable-speed feeder conveyor were made by the Conveyor Co. and the latter is powered by a Sterling Speed-Trol variable-speed motor-reducer controlled from the plant 500 ft. way. The material excavated in the pit is discharged into this hopper and can be fed out of it to the plant at the desired speed which varies with the type of material and the product being made.

The Marquette Cement Mfg. Co. in 1938 took over the plant of the Wolf River Sand & Gravel Co., Memphis, Tenn. The plant is being entirely rebuilt with a Kern tower storage system, new screens and other equipment.

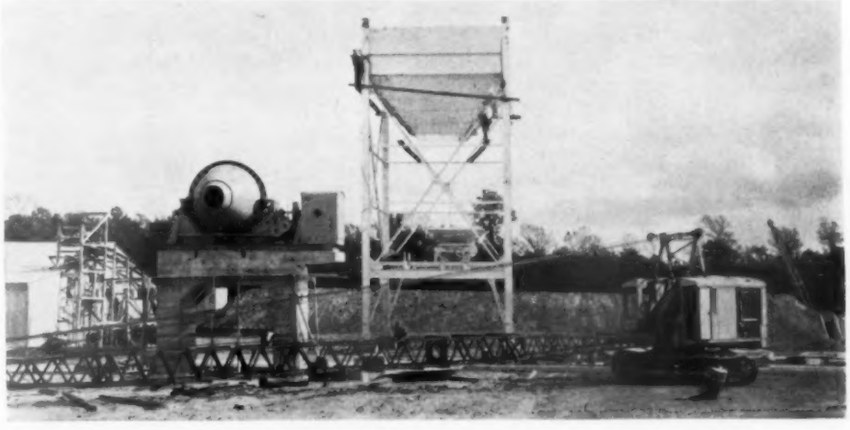
Parker Bros. & Co., Inc., Houston, Texas, one of the largest producers of sand and gravel, shell and ready-mixed concrete in the Southwest are completing a modern new yard on the Ship Channel in Houston. This yard will be used for the storage of sand and gravel and shell received by water or rail. A stock-pile on the wharf has a



The 15-in. pump on the new dredge of the Sturm & Dillard Co., Circleville, O.

400-ft. tunnel-reclaiming conveyor from which a long inclined conveyor will feed material into the bins of new ready-mixed-concrete and aggregates-bituminizing plants. Gravel received by rail is stored in another stockpile which is also served by a tunnel conveyor. The concrete plant has a 3-cu.yd. Smith mixer and will also be used for dry batching. The asphalt plant will produce a patented type of stabilized asphalt mixture in which the mud in the unwashed shells will be an important factor.

G. G. Hill & Co., Dexter, Mo., built a new washing and screening plant with a Sauerman scraper. Several screens were installed by the A. E. Barker Gravel Plant, Waco, Tex. The



The new storage yard of Parker Bros., Houston, Texas, under construction. In foreground are concrete and asphalt plants.

Garcia Construction Co., Irvington, Cal., installed a sand classifier and a scrubber.

The Callan Construction Co., Bristol, R. I., operating three permanent gravel plants, added two Bucyrus-Erie 1¼-cu.yd. gas shovels and Caterpillar and Allis-Chalmers tractors equipped with bulldozers. Charles Hulme, Great Bend, Kans., bought a 4-cu.yd. Continental scraper, a 10-B Bucyrus-Erie crane and a Caterpillar tractor.

The Concrete Service, Traverse City, Mich., built a small new plant. New equipment included a crusher and an electric welder. Harry R. Carlton, Sterling, Ill., bought an Iowa Mfg. Co. portable plant. A vibrating screen was installed by the Industrial Aggregate Co., Minneapolis, Minn. A 10-in. dredge pump was installed by the Holloway Gravel Co., Amite, La. The Irving Bros. Sand & Gravel Co., New Haven, Ind., added a crusher and a crane. D. E. Hubbard & Sons, Bay Shore, N. Y., added some screens.

A new steel dredge with an Eagle Swintek ladder was built by the Sturm & Dillard Co., Circleville, O. The Gifford-Hill Co. installed a Pettibone-Mulliken Diamond dredge pump and cutter at its Minden, La., plant. A complete 8-in. Morris suction dredge was installed by the General Crushed Stone Co., at Forestport, N. Y. A 10-in. Amsco pump and a 250-hp. Fairbanks-Morse Diesel engine were installed by the Waters & McCrary Gravel Co., Columbus, Miss. Amsco 8-in. pumps were installed by the Fleming Gravel Co., Columbus, Miss., and the Prairie Sand & Gravel Co., Rochester, Mich., The Henderson Sand & Gravel Co., Rochester, Mich., installed a 6-in. Morris pump. A 4-in. dredge pump and boat were installed by the J. H. Perkins Trucking & Material Co., Johnson City, Tenn. May Bros., Fairmont, W. Va., bought a Tyler Hum-mer screen and installed a new ladder on a dredge.

The Dravo Co., Pittsburgh, Pa., installed a 7-ft. by 48-in. Hardinge scrubber on a dredge. Minus 4½-in. gravel containing 10 per cent. clay is cleaned at the rate of 60 tons per hour.

The Chapman Gravel Co., Durand, Mich., added a ½-cu.yd. Bay City shovel. A ⅝-cu.yd. Bay City shovel was installed by the East Lansing Gravel Co., East Lansing, Mich., and other equipment was purchased. A system of dry excavation replaced the dredge formerly used. A ⅝-cu.yd. Koehring shovel and a 10-ton International trailer truck were purchased by the Benton-Manson Co., St. Petersburg, Fla.

The Laura Gravel & Stone Co., Arcanum, O., bought two new Lima 1¼-cu.yd. gasoline shovels. A ⅜-cu.yd. Bucyrus-Erie shovel was purchased by Seybold Bros., Dunkirk, N. Y. The Miller Gravel Co., Otisville, Mich., added a ¾-cu.yd. Thew shovel and a ⅝-cu.yd. Koehring shovel. The Beloit Concrete Stone Co., Beloit, Wis., added a ⅜-cu.yd. Bucyrus-Erie shovel and a Caterpillar tractor and scraper.

The Worden Sand & Gravel Co., Bedford Hills, N. Y., one of the first producers to use Diesel engine trucks, added three more to its fleet in 1938. A Sauerman 3-cu.yd. Crescent scraper, an American hoist and a Barber-Greene belt conveyor were also purchased. The Consolidated Rock Products Co., Los Angeles, Cal., bought six trucks with 150-hp. Diesel engines.

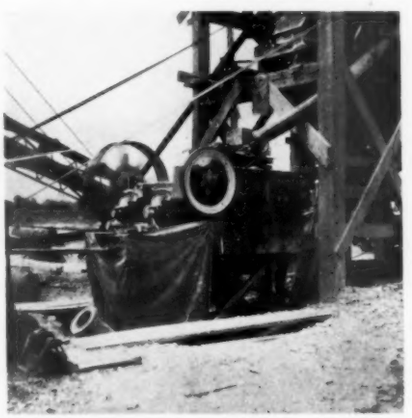
The Andersen Sand & Gravel Co., Juniata, Mich., added a Federal 14-ton truck with a 150-hp. Cummins Diesel engine and a General Motors truck with a Hercules Diesel engine. A 50-hp. McCormick-Deering Diesel engine was installed in the plant. Two 12-ton Mack trailer trucks were purchased by the Minnesota Sand & Gravel Co., Minneapolis, Minn. D. G. Hill & Co. bought the plant of the Energy Gravel Co. at Keener, Ark. A Fairbanks-Morse Diesel-generating set was installed and other improvements made.

The Carroll Sand & Gravel Corp., Clarence, N. Y., bought two Buffalo vibrating screens. A new Buckeye 300-hp. Diesel engine was also installed to generate power for the plant. This operation was described in the December, 1938 issue of PIT AND QUARRY.

The Grays Harbor Construction Co., Aberdeen, Wash., installed a 20-in. Universal crusher on a dredge. A new 4-ft. Symons cone crusher was installed by the Glacier Gravel Co., Steilacoom, Wash. A McNally crusher was installed by the Independent Sand & Gravel Co. at Webb City, Mo. An Allis-Chalmers gyratory crusher was installed by the California Rock Co.,

The new portable plant of the Deppe Lumber & Produce Co., Baraboo, Wis., which supplements the permanent plant operated by that company.

A tractor and bulldozer used by the Basalt Rock Co., Napa, Cal., for stock-piling aggregates.



A view of the new roll-crusher at the Wm. Click plant shortly after it was installed.

Orange, Cal. Lattazio Bros., Glenville, N. Y., installed a Kennedy-Van Saun reduction crusher. The Construction Materials Co. added to its crushing and screening equipment at Ferrysburg, Mich. Symons cone crushers were installed by the Ward Sand & Gravel Co., Oxford, Mich., the Massillon Washed Gravel Co., Navarre, O., the Fordyce Gravel Co., Mission, Tex., Pacific Coast Aggregates, Inc., Oakland, Cal., and the Arrow Rock Co., Los Angeles, Cal. Blair & Le Roy, Franklin, O., installed Iowa Mfg. Co. Cedar Rapids jaw and roll crushers.

The B. V. Hedrick Gravel & Sand Co., Lilesville, N. C., installed two 4-ft. by 12-ft., 3-deck, Screen Equipment Co. "Seco" vibrating screens. A Seco screen was also installed by B. C. Perkins, Ithaca, N. Y. Robins Vibrex screens were installed by the South Hamilton Sand & Gravel Co., Hamilton, O., the Exner Sand & Gravel Corp., Bronx, N. Y., the Lake Geneva Sand & Gravel Co., Fontana, Wis., and the Anderson Sand & Gravel Co., Rockford, Ill. The Central Michigan Gravel Co., Lansing, Mich., bought a Simplicity screen and a ⅜-cu.yd. Bay City shovel. Simplicity screens were also installed by the White Sand & Gravel Co., Clarkston, Mich., and the Bowsman Washed Sand & Gravel Co., Piqua, O. A Kennedy-Van Saun vibrating screen and a Barber-Greene loader were purchased by the Morse Sand & Gravel Co., Pawtucket, R. I. An Allis-Chalmers screen was installed by the Perkins Gravel Co., Perkins, Cal.

T. L. Herbert & Sons, Nashville, Tenn., rebuilt one of its dredges. An Allis-Chalmers Low Head screen was also purchased. Jewell Frese, Spokane, Wash., installed a new Symons screen and a 300-ft. Barber-Greene belt conveyor. Saxton, Looney & Risley modernized its plant at Hillsboro, Ore., and replaced a Diesel engine drive with individual electric motors.

The Dauphinais Sand & Gravel Co., North Grafton, Mass., installed considerable new equipment. Included were: an Austin Western gyratory crusher, a Good Roads feeder, a Barber Greene belt conveyor, two revolving screens and a triple-screw sand washer. The Mason Gravel & Sand Co., Edgerton, O., added a Simplicity screen and an Allis-Chalmers engine.

The Alfred-Atlas Gravel & Sand Corp., Alfred, N. Y., added two vibrating screens, a Bucyrus-Erie shovel and a truck. The Missouri Portland Cement Co., Memphis, Tenn., installed an Eagle Swintek ladder and made other improvements.

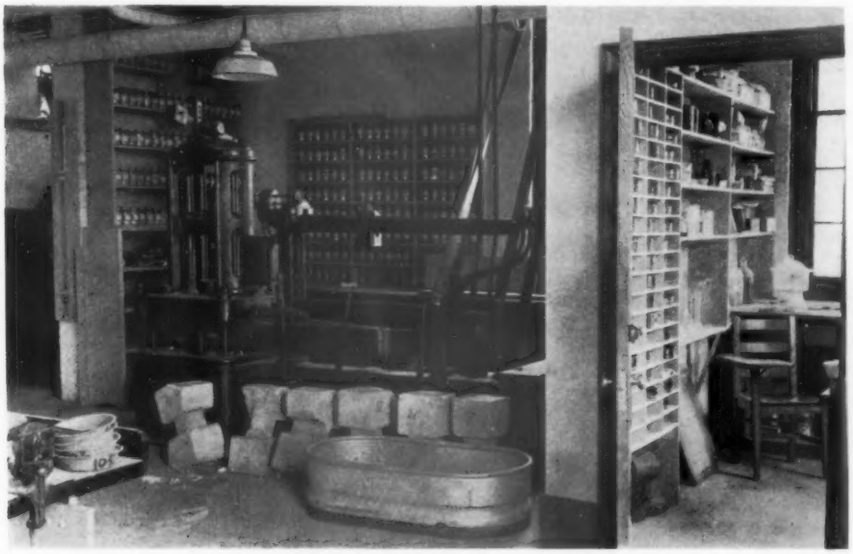
Cobb & Homewood, Chapel Hill, N. C., installed a new screening and washing plant. The Highland Park Sand Co., Richmond, Va., bought a used Bucyrus-Erie shovel and a belt conveyor. The Gallagher Bros. Sand & Gravel Corp., New York, N. Y., added bucket lines, classifier and an elevator and made other improvements.

Charles H. Hoyt, Silverton, Ore., added a Bucyrus-Erie shovel, a Telsmith crusher, a Traylor crusher and a Symons screen. The Iron City Sand & Gravel Corp., Pittsburgh, Pa., installed a washing grizzly hopper and pump. Wm. P. Carpenter, Peekskill, N. Y., added two Byers shovels and a Haiss loader, all used.

Wm. Click, Avoca, Mich., added New Holland roll crusher, vibrating screen and elevator, a dragline hoist and a Diesel engine. An article describing this plant was published in the October, 1938 issue of PIT AND QUARRY. Her-

Loader feeding material from bank into truck for haulage to plant of Brooks-Wright, Inc.

Cars being loaded with sand under the two 15-ft. rake classifiers in the new plant of the Montgomery Gravel Co. at Montgomery, Ala.



The new laboratory of the National Sand & Gravel Assn. One of the compression-testing machines and the laboratory office are shown.

shee & James, Mt. Gilead, O., bought a shovel. A 4-cu.yd. Continental wagon scraper was purchased by the Central Construction Co., Waubay, S. D. The Western Massachusetts Sand & Gravel Co., Westfield, Mass., installed a Kennedy-Van Saun sand classifier and a Blaw-Knox batcher.

The Atkinson Sand & Gravel Corp., Atkinson, Nebr., bought an Allis-Chalmers tractor and a 1-cu.yd. scraper. Graham Bros., Inc., Los Angeles, Cal., added two Caterpillar tractors with Le Tourneau scrapers and some trucks. The Blue Valley Gravel & Sand Co., Fairbury, Neb., installed an 8-in. pump on its dredge. A turbine pump and electric and acetylene welding outfits were also purchased.

Courtney & Plummer, Neenah, Wis., installed a roll crusher, a Jigger screen and an International Diesel engine. The Cleveland Builders Supply Co., Cleveland, O., added a dragline. A Telsmith vibrating screen and a Northwest dragline were added by the Hamlin Sand & Gravel Co., Vernon, Tex.

The Concho Sand & Gravel Co., Oklahoma City, Okla., added an Austin-Western jaw crusher, an Ingersoll Rand compressor, belt conveyors and other equipment. The Coogan Gravel Co., Peoria, Ill., added a roll crusher, a vibrating screen, and conveyors.

The R. G. Holm Quarry, Waterloo, Ia., bought an Iowa Mfg. Co. sand and gravel plant, roll crusher, etc. Brown Bros., Howard, Ga., added a sand washer, a power unit and elevators. The W. R. Bonsal Co., Camden, S. C., added an Allis-Chalmers screen.

The American Sand & Gravel Co., Hattiesburg, Miss., added two portable plants. The Acme Sand & Gravel Co., Watertown, Mass., bought three 5-ton trucks and a 75-B Lorain crane and built a new plant. The Allegheny River Sand Corp., Parnassus, Pa., bought a Wiley Whirley crane. Wm. H. Barber,

Portable crushing plant of the Central Construction Co. with scraper dumping a load over the grizzly.

The 8-in. pump on the dredge of the Carolina Sand & Gravel Co. with the 104-hp. Diesel engine in background.

Cincinnati, O., bought a vibrating screen and a bucket elevator. The Arkansas River Sand Co., Tulsa, Okla., added a double-drum hoist and a gasoline engine.

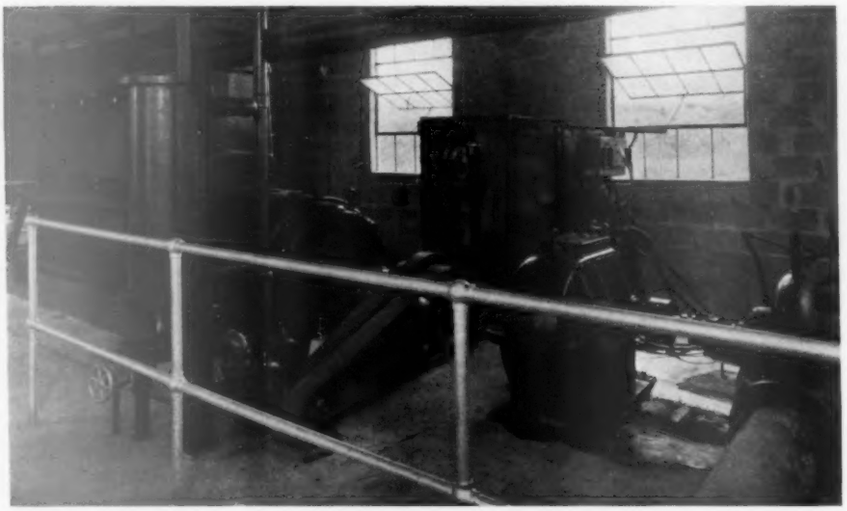
J. E. Montgomery, Mount Dennis, Ont., bought a Northwest shovel, a Northwest crane and a Mack truck. A Barber-Greene stockpile loader was purchased by the Morgan Gravel Co., Hinsdale, Mass. The Merom Gravel Co., Indianapolis, Ind., installed a General crane and a 600-ft. belt conveyor. The Atlas Sand, Gravel & Stone Co., Hartford, Conn., installed a screen and a settling tank.

The Azusa Rock & Sand Co., Monrovia, Cal., bought ten delivery trucks, a 1¾-cu.yd. gasoline shovel and other equipment. The Mizpah Sand-Gravel Co., Mizpah, N. J., enlarged its plant. A 10-in. Amsco pump was installed by the Monroe Sand & Gravel Co., Amite, La.

The E. C. Gaines Sand & Gravel Co., Elizabethtown, Ill., launched a new derrick boat. The Manning & Locklin Northville Co., Detroit, Mich., installed a Simplicity vibrating screen. The Ambraw Gravel Co., Lawrenceville, Ill., bought a ⅜-cu.yd. P&H combination shovel, crane and dragline.

The Memphis Stone & Gravel Co., Memphis, Tenn., bought a Speeder shovel-dragline, a Deister vibrating screen, a Northern portable belt-conveyor and some portable bins. Bichler Bros., Escanaba, Mich., bought a soft stone eliminator and an arc welder. Brand & Deal, Elkhart, Ind., bought a Jeffrey bucket loader, several belt conveyors, a Good Roads rotary screen, and other equipment.

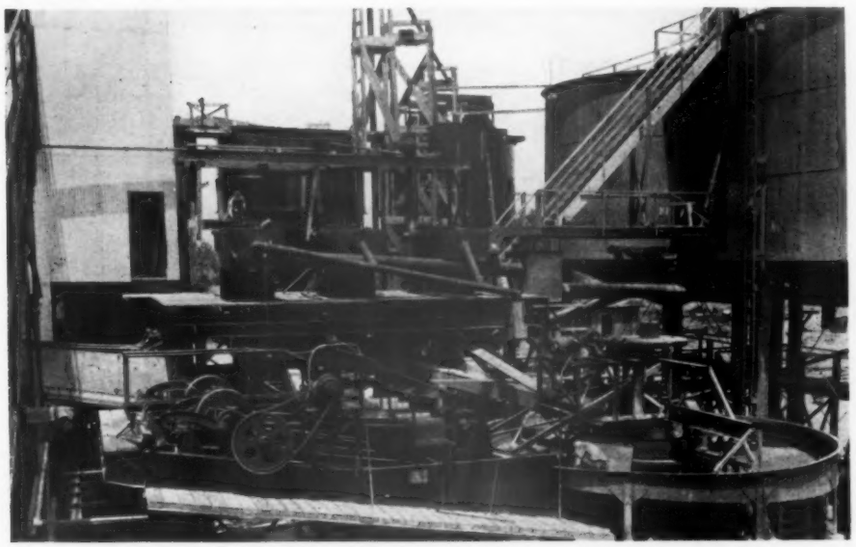
The Modern Sand & Gravel Co., Pacific, Mo., installed a 1300-hp. Fairbanks-Morse Diesel engine and a 200-kw. generator to operate its plant. The Metropolis Sand & Gravel Co., Metropolis, Ill., added a 200-ton barge. The Negley Sand Co., Negley, O., installed bins, screens, crushers and conveyors. The Glenn-Rock Products, Jamesburg, N. J., installed a rotary sand screen.



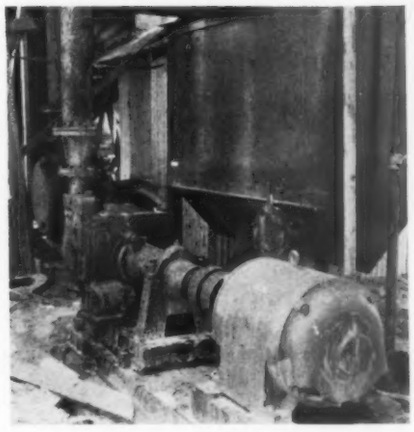
The new 300-hp. Diesel engine of the Carroll Sand & Gravel Corp. The generator supplies power for plant operations and a water pump at right is driven through a speed reducer.

Gypsum, Phosphate, Feldspar, Other Groups Record Important Advances

The new plant of the Swift & Co. Fertilizer Works near Agricola, Fla., with flotation department at left.



The 20-ft. bowl classifier in the Swift plant with rake classifier and three 5-pocket sizers in background.



The 4-in. and 6-in. pumps which feed from and to the sizers, respectively.

This 6-in. rubber-lined centrifugal pump handles the overflow from the log washers.

IN this review an attempt will be made to cover developments in the many industries not reviewed separately elsewhere. Many of the industries included here are important enough to merit separate reviews, but lack of space makes this impossible. For this reason also, only enough of the many interesting and important developments are covered to give the reader some idea of the activity and progress of these industries.

From the incomplete information available at this time it seems evident that some of these industries suffered a slight loss of business in 1938, this being particularly true of silica sand and the various industrial clays. Many however, held their own or showed increases over 1937. The best individual showing was probably made by the rock-wool industry. Almost without exception these industries have profited by the current improvement in general business conditions and 1939 should see many of them reaching the highest level of production since 1930. A few should attain an all-time peak.

The demand for new plants, and processes and improvements to existing plants, continued throughout the year regardless of fluctuations in business conditions. Judging from the new plants and improvement programs now under way or contemplated, these industries are preparing themselves not only for a greater demand but also for more efficient operation.

Developments in the gypsum industry were confined mainly to further expansion of the large companies which dominate the field. There was little increase in the productive capacity of raw gypsum, efforts being devoted mainly to the manufacture of new types of building products.

Most active was the National Gypsum Co., Buffalo, N. Y., which took over the Best Bros. Keene's Cement Co., with operations at Sun City and Medicine Lodge, Kan., and the Oakfield Gypsum Products Corp., Oakfield, N. Y. A new fiber-insulation-board plant was built at Mobile, Ala. Construction has started on a new gypsum wall-board plant to be built at Savannah, Ga. A large Page electric walking drag-line was installed at National City, Mich., and this is reported to have cut the cost of stripping considerably. A Raymond mill was installed in the company's lime plant at Luckey, O. The company also rebuilt its plaster plant at

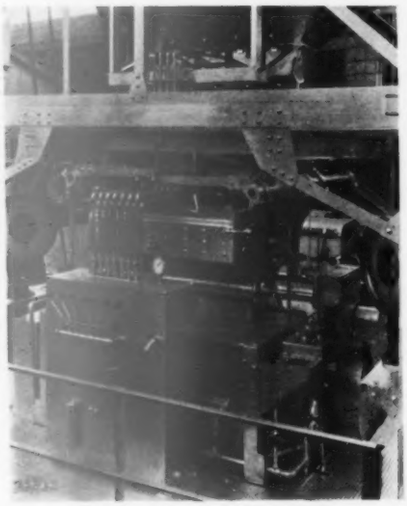
Fort Dodge, Ia., which was destroyed by fire last year.

The Celotex Corp., Chicago, Ill., early in 1938 took over the properties of the Gulf Gypsum Co. at Falfurias, Tex. Plans to build a large wallboard mill on the Gulf Coast were announced. The United States Gypsum Co. installed a Robins Vibrex screen at Loveland, Colo., and announced plans for a new gypsum-processing and products plant to be built near Jacksonville, Fla.

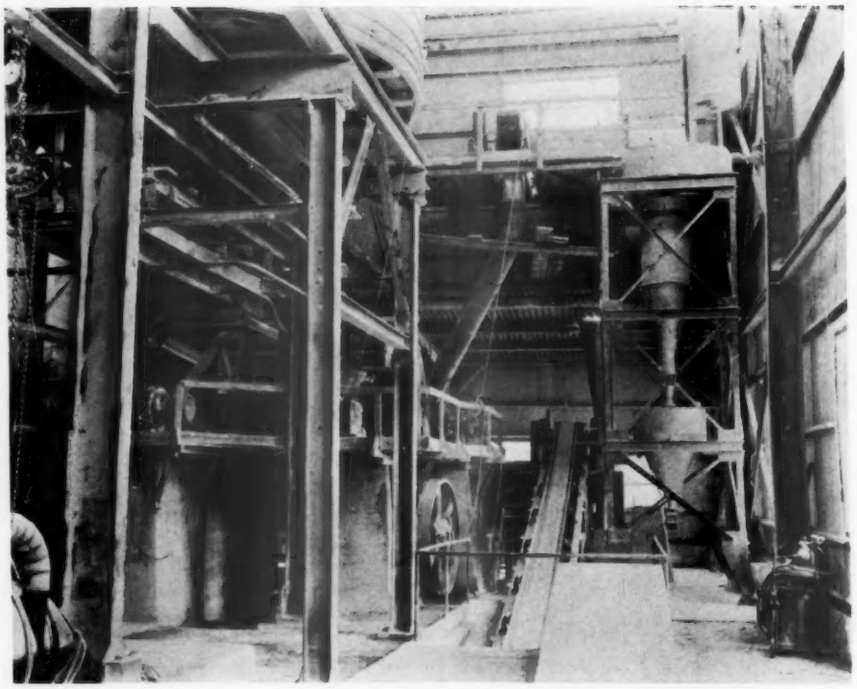
The phosphate industry was again quite active. The outstanding plant development was the new washing-and-flotation plant built by the Swift & Co. Fertilizer Works 10 mi. southeast of the company's drying plant at Agricola, Fla. A complete description of this plant was published in the December, 1938 issue of PIT AND QUARRY. A feature of this operation is the combined agglomeration-flotation process which removes from the sand the phosphate rock which is too coarse for flotation and too fine to be handled over the washer.

A new drag-line was purchased to remove overburden from this deposit. This Page all-electric walking machine has a 160-ft. boom and operates an 8-cu. yd. Page heavy-duty bucket. It is said that this is one of the lowest-cost dirt-moving operations in existence.

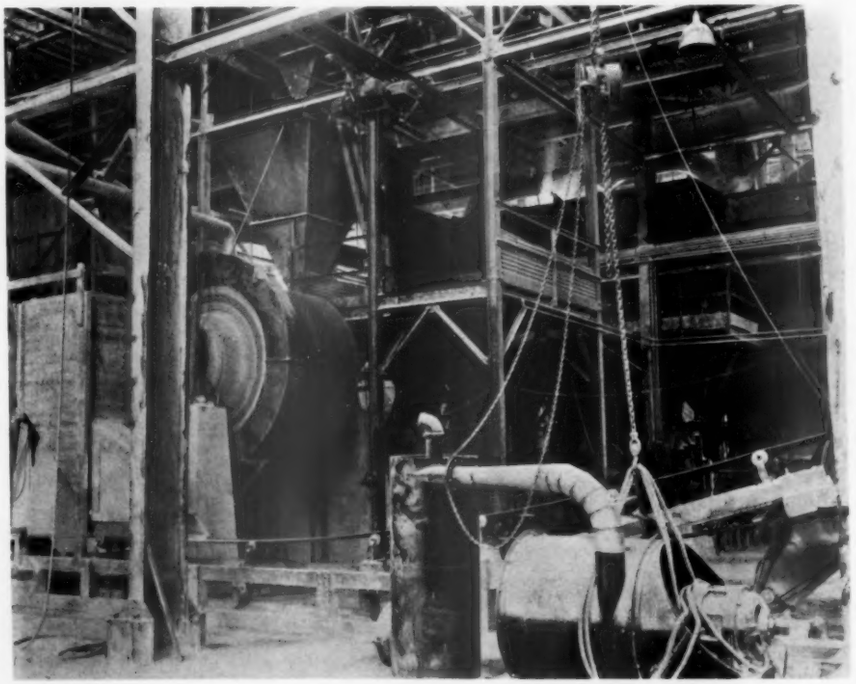
Other than those described above, operations and equipment follow the usual practice in the Florida phosphate field. Material is hydraulicked and pumped to the plant. The sludge is given the usual screening and scrubbing to remove washed coarse rock and pebble rock. The fine material remaining is split to two 40-ft. Dorr hydroseparators. Three Dorr-Fahrenwald sizers are used for further separation into two or three fractions as desired. The coarse material goes to a Dorr rake classifier and is used for the combined agglomeration and flotation.



The operating platform of the new Bowsman asphalt plant.



Interior view of the new plant of the American Nepheline Co. at Rochester, N. Y. Roll crusher at left and one of dust collectors in background.



Another view of the American Nepheline plant with conical mill at left and main dust-collecting system in background.

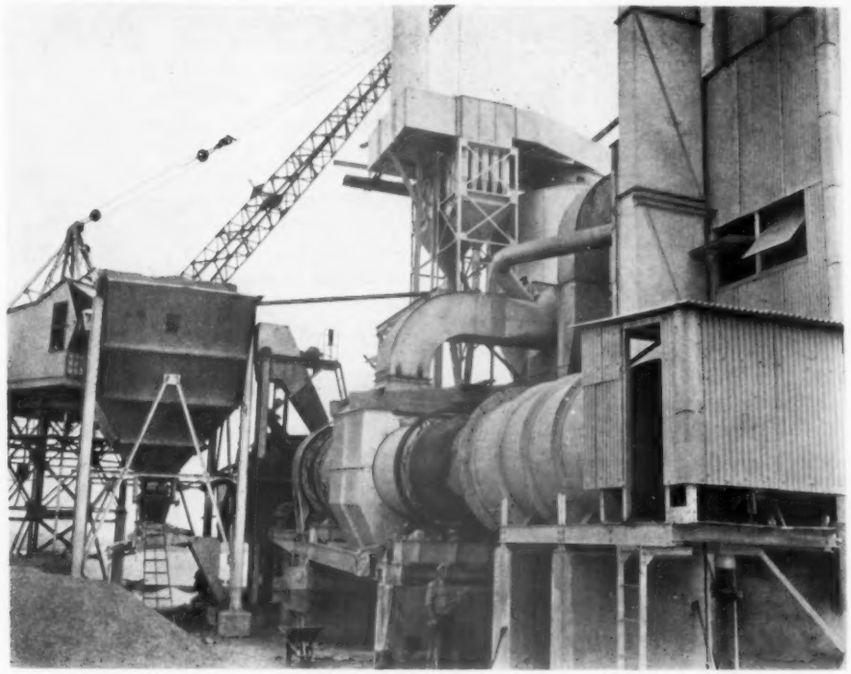
In this process the coarse feed is treated with suitable reagents, causing the phosphate particles to agglomerate and pass over an inclined under-water screen. Tailings from this screen go to the flotation cells for further treatment. The fine material from the sizers goes to a bowl-and-rake classifier. Minerals Separation counter-current flotation machines form the final step in the preparation of the concentrates.

The feldspar industry was also quite busy. The outstanding development was the new plant of the United Feldspar Corp. at West Paris, Me. The Black Hills Mining & Industrial Assn., Pringle, S. D., completed the third unit of its plant and is working on the fourth. Improvements were made to the plant of F. E. Schundler & Co. at Custer, S. D. Realty, Inc., Thermal City, N. C., plans to erect a new finishing plant. The Eureka Flint & Spar Co. plans to build a new plant in Connecticut.

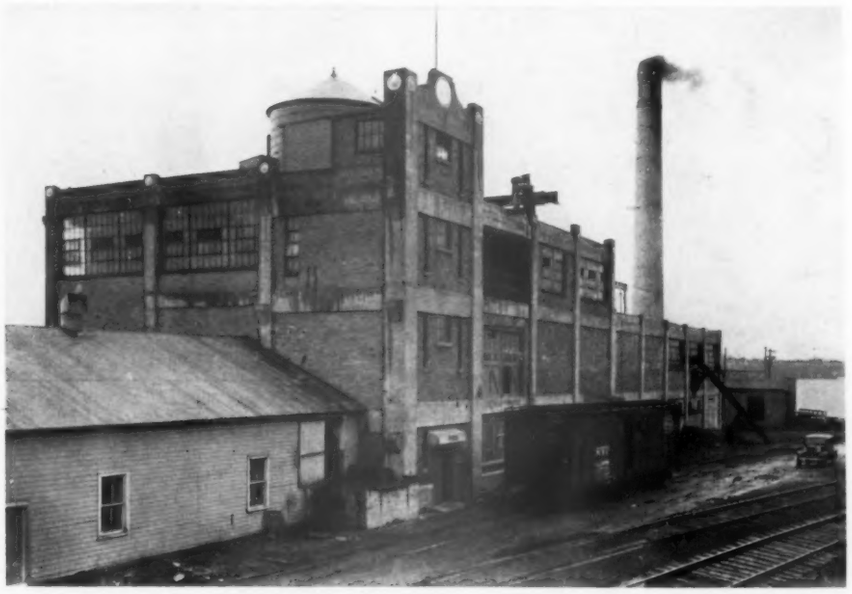
The invasion of the ceramic field by nepheline syenite was intensified early in the year by the completion of the new processing plant of the American Nepheline Co. at Rochester, N. Y. This company is a subsidiary of Canadian Nepheline, Ltd., which operates a similar plant at Lakefield, Ont.

At the Rochester plant the rock is dumped from railroad cars into a track hopper, from which a belt-conveyor carries it to the bins. A jaw crusher, a Ruggles-Coles drier, a Traylor roll-crusher, a Hardinge mill, a Tyler Hummer screen, a Gayco air-separator, and a Sly dust-collector are other pieces of equipment. Exolon and Dings magnetic separators are used.

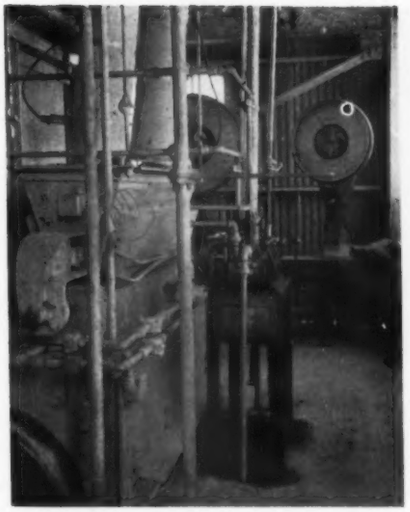
The most important development in the talc and pyrophyllite industries was the building of the new plant of the Carolina Pyrophyllite Co. at Glendon, N. C. This plant has a capacity of 60 tons daily and uses Hardinge equipment. Improvements were also made at the plants of the Oxford Mining & Milling Co., West Paris, Me., and Standard Minerals, Inc., Hemp, N. C. The Clinchfield Sand & Feldspar Corp. started production of talc near Murphy, N. C.



The new aggregate-bituminizing plant of the Del Balso Asphalt Corp. The drier with wind chamber, dust-collection equipment and elevator at right. At left are aggregate bin, feeder and elevator.



This impressive building houses the operations of the Long Valley Ore Co., Morristown, N. Y., new producer of graphite.



The 1-ton mixer, batcher, bitumen bucket and dial scales in the Del Balso plant.

The Eastern Magnesia Talc Co., after years of experimentation at its Johnson, Vt., plant, built a flotation plant which makes it possible to save the talc formerly wasted. Magnesite is being obtained in commercial quantities. The new equipment includes a Hardinge rotary drier, a Deister Plat-O concentrating table, 3 Denver Sub-a flotation cells, etc.

In the main talc plant a Hardinge "electric ear" was installed to regulate the feed to an 8-ft. Hardinge mill. The "ear," actually a microphone, is under the mill at the point where the grinding media strike the shell. The volume of sound is converted into electrical energy in a control box. An increase in the volume of sound indicates too light a load in the mill and closes a magnetic switch. This switch feeds current to a magnetic coil which in turn pulls a pawl in contact with a ratchet on the feeder drive shaft. A deadening of the sound shuts off the current to the coil, pulling the pawl out of contact with the ratchet and shutting off the feed. This system of control has eliminated the human element in the control of the mill feed and has resulted in a higher capacity and more even grinding.

The domestic graphite industry took a new lease on life with the completion of a new plant at Morristown, N. Y., by the Long Valley Ore Co. This is said to be the only crystalline-graphite plant now in operation in this country. Two grades of graphite are produced. Dorr and Hardinge equipment is used. The Graphite Corp. has announced its intention to build a new plant at Shelbyville, Tenn.

The development of greatest importance in the asbestos industry in 1938 is the extensive improvement program un-

der way at the plant of the Asbestos Corp., Thetford Mines, Quebec. The new equipment installed includes a Birdsboro crusher.

The Vermont Asbestos Corp. made further improvements to its plant at Eden, Vt. The new equipment includes a Symons cone crusher, an 80-in. by 60-ft. Hardinge Ruggles-Coles drier, and a Tyler Niagara screen. The extension of the quarry into better raw material and improved processing methods have resulted in a product which compares favorably with the best imported fiber. The Emsco Asbestos Co., Downey, Cal., built a new fiberizing mill with a capacity of 600 tons monthly. The Johns-Manville Co. has announced plans for the construction of a new insulating-board plant at Jarratt, Va.

One of the interesting new aggregate-bituminizing plants of the year was that

The new skip-hoist and storage system of Basic Dolomite, Inc.

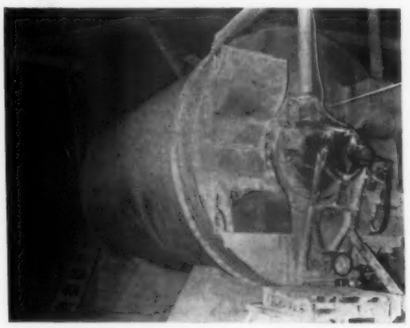
of the Del Balso Asphalt Corp., Bronx, New York, N. Y., which was described in the November, 1938 issue of PIT AND QUARRY. This is one of the first plants to use electricity for all heating purposes and incorporates automatic control wherever possible. The plant is built entirely of steel and concrete and was designed, fabricated and erected by the McCarter Iron Wks., which also supplied most of the equipment.

Aggregates are received in barges and

The 5-roller, high-side mill in the Louisiana Boganite Co. plant.

transferred by a whirley into bins, from which a Jeffrey-Traylor feeder measures them out into the McCarter-Morris drier. This drier can be used as a drier-cooler and is connected to a cyclone and a dual Multiclone for dust collection. The dried aggregates go to a Nordberg Symons screen and into bins. Dust is stored in a separate bin.

Asphalt is stored in four 25,000-gal. tanks with electric heating elements. The two 4,500-gal, superheaters used



The new drier in the plant of the Vermont Asbestos Corp. at Eden, Vt.

are also electrically-heated and automatically controlled. The pipe-lines to the mixing floor are heated by electric elements wound spirally around the pipes. Asphalt for the 1-ton and 2-ton mixers is measured in electrically-heated buckets. Hydraulically-operated gates feed aggregates into the aggregate batchers. Push-button controls and a time-lock system automatically control the operation of the 2-ton mixer on a pre-determined mixing schedule

The Bowsman Washed Sand & Gravel Co., Troy, O., installed a Hetherington & Berner semi-portable aggregates-bituminizing plant, which is so designed that the mixer, weighing unit, bin, and screen are complete individual units, none more than 8 ft. wide or long enough to make them difficult to handle. A 40-ton bin, a 5-ft. by 30-ft. drier, a boiler, and a hydraulic control system complete the plant. This operation was described in the November, 1938 issue of PIT AND QARRY.

The Old Colony Asphalt Concrete Co., early in 1938 combined its cold-mix plant on the property of the affiliated Old Colony Crushed Stone Co., Quincy, Mass., with a Warren Bros. hot-mix plant brought in from another location. A new 5½-ft. by 30-ft. Warren Bros. direct-heat rotary drier, a Jeffrey-Traylor vibrating feeder and other machines were added. The combined operation now has a capacity of over 1,500 tons daily of hot, cold, or intermediate types of mixtures. A complete description of this plant was published in the September, 1938 issue of PIT AND QUARRY.

A Warren Bros. aggregate-bituminizing plant was set up by the Tuskegee Asphalt Corp. on the property of the affiliated Tuskegee Sand & Gravel Co., near Tuskegee, Ala. This plant has a capacity of 1,200 tons daily and is said to be the largest operation in the south. A 5½-ft. by 42-ft. drier-cooler and a 2-ton mixer are used.

The Southwest Stone Co. recently installed a cold-mix asphalt plant at its quarry at Chico, Tex. The City Rock & Gravel Co., Sunland, Cal., installed a Madsen asphalt plant. The Pekin Stone Products Corp., Lockport, N. Y., installed a $10,000 asphalt plant. An amiesite plant was established by the Suburban Construction Co. on the property of Whiterock Quarries, Inc., Pleasant Gap, Pa. A Warren Bros. plant was installed by Powers Bros., Brockton, Mass.

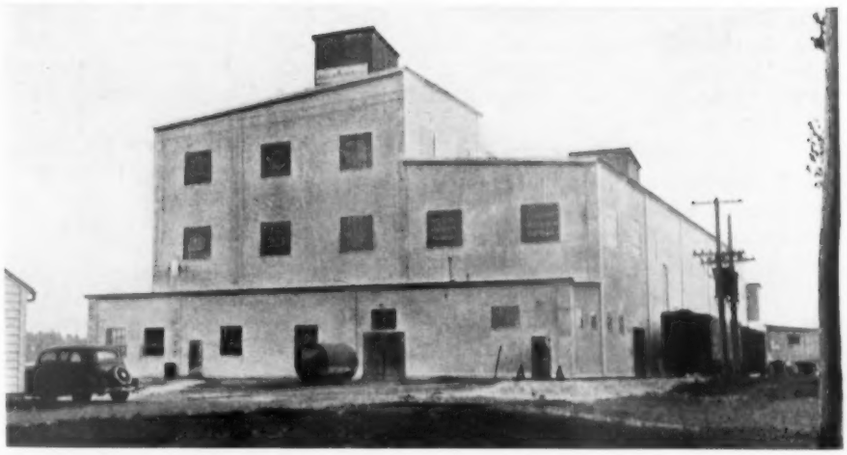
The General Crushed Stone Co. continued its expansion in this field by buying the black-top plant of A. L. Blades

One of the grinding mills in the plant of the Carolina Pyrophyllite Co.

at Hornell, N. Y. A new addition to its amiesite plant at Hazelton, Pa., was also completed. Improvements were made to the Warren Bros. plant of Trimont Bituminous Products Co., Saugus, Mass., and Bituminous Materials Co., Louisville, Ky. Wm. S. Hammaker, Harrisburg, Pa., installed an Easton-Clarmac electric superheater for heating bitumen. The Franklin Contracting Co., Great Notch, N. J., installed an Easton-Clarmac superheater and Easton equipment for electrically heating five bitumen tanks with a total capacity of 75,000 gal.

F. H. Gates, Inc., Santa Maria, Cal., sand-and-gravel producer, installed a hot-mix plant. The Mansfield Asphalt Paving Co., Mansfield, O., bought $10,000 worth of equipment. A new plant was installed by the Amiesite Corp. of Pa., Chester, Pa. Bituminous Products, Inc., Buffalo, N. Y., installed vibrating screens, a mixer, motors, speed-reducers, etc. The Burrell Construction & Supply Co., New Kensington, Pa., added a 2-ton mixer, batcher bins, scales and two 3-ton trucks. Two new plants were installed by the Interstate Amiesite Co., Wilmington, Del.

E. P. Brady of Flint, Mich., operated a new Pioneer No. 73 stabilizing plant for the production of road material stabilized with calcium chloride, at various locations in Michigan. The equipment includes a clay feeder, a clay shredder, a pug-mill, a calcium-chloride hopper, etc. Automatic adjustable feeders proportion the ingredients.



The new plant of the American Nepheline Co. at Rochester, N. Y., which processes nepheline syenite shipped in from Canada.

John G. Yerington, sand-and-gravel producer and contractor of Benton Harbor, Mich., bought a Barber-Greene stabilizing plant, which was operated during the year to fill a number of contracts. This plant consists of two units mounted on rubber tires. One unit consists of clay and aggregate hoppers, feeders, clay-shredding rolls, a calcium-chloride hopper and feeder, and a belt-conveyor running to the mixing unit. This unit consists of a pug-mill of the continuous type under which trucks are loaded.

The Central Silica Co., Zanesville, O., has an extensive improvement program under way at its Glass Rock plant. This consists of a new wet mill with a Traylor jaw crusher and a chaser mill with 30-in. screw-washers. Rotary driers are being replaced by a steam drier served by a new 250-hp. Babcock & Wilcox Sterling boiler.

The National Pulverizing Co., Millville, N. J., installed vibrating screens, screw-conveyors, and a drag-line. The South Jersey Sand Co., Philadelphia, Pa., bought a dredge and a new Dorr classifier. A modern new silica-sand plant is being built by the Moapa Minerals Co., Overton, Nevada, to replace one destroyed by fire.

The new plant of the Louisiana Boganite Co., Bogalusa, La. Drier and storage sheds for raw clay are at right.

The Silica Co. of California, Ltd., made a number of improvements to its plant near Brentwood, Cal. Four large bins with conveyors and elevators were built. The underground mining system has been replaced by open-pit methods using truck haulage. The wet-screening department was rebuilt and four Straub screens installed. Other new equipment includes a ball-mill and Dorr classifiers. The Century Silica Co. in 1938 completed the construction of a new plant at Foxburg, Pa.

The tremendous increase in the demand for home-insulation materials has been responsible for a mushroom-like growth in the rock-wool industry. One of the important developments in the last year was the construction by the Johns-Manville Corp. of a huge new plant near Long Beach, Cal., for the production, among other things, of rock wool. Among the many other new plants built were those of the Edwards Insulation Co., Temple, Tex., the Northern Rock Wool Co., Pontiac, Mich., and the P. J. Sonner Burner Co., Winfield, Kan. The Therminsul Rock Wool Co. took over the new plant of the Superior Rock Wool Co. at Lagro, Ind., and put it in operation. The Insulating Products Co., Aurora, Ill., installed conveyors and three cupolas for the manufacture of rock wool. A Jeffrey vibrating feeder was installed by the Industrial Minerals & Chemical Co., Berkeley, Cal. The Crystal Silica Co., Los Angeles, Cal., bought a tractor and scraper to remove overburden and haul raw material to the plant.

The Insulation Mfg. Co., Salt Lake City, Utah, installed a crusher, a screen and belt-conveyors. The Coast Insulating Corp., Los Angeles, Cal., installed conveyor belts, two furnaces, a boiler, and other equipment. A new mineral-wool plant was built by the Kentucky Stone Co. at Mullins, Ky. The Ohio Valley Rock Asphalt Co. built a rock-wool plant at Summit, Ky.

The Canadian Gypsum Co., Ltd., a subsidiary of the United States Gypsum Co., built what is said to be the largest and most modern rock-wool plant in Canada at Weston, Ont. Many other new plants are under construction or contemplated.

The Cambria Slag Co. installed a new Symons screen at Sharpsville, Pa., and a Niagara screen at New Castle, Pa. A screen was installed by the Canton Slag Co., Youngstown, O. The Cleveland Slag Co., Youngstown, O., added a crusher, a screen and a gasoline shovel. A 4-ft. short-head Symons crusher was installed by the Maryland

Slag Co. at Sparrows Point, Md. A 3-ft. short-head crusher was added by the Cleveland Slag Co., Cleveland, O.

The Birmingham Slag Co., Birmingham, Ala., added vibrating screens, a 35-ton Diesel locomotive, and an electric locomotive crane and built a shop building. A 4-ft. by 14-ft. Seco (Screen Equipment Co.) screen was installed by the Philadelphia Slag Co., Swedeland, Pa. The Troy Slag Products Co., Troy, N. Y., installed a New Holland roll-crusher, screen, and a gasoline engine.

Producers of industrial clays were active during the year. The Louisiana Boganite Corp. recently completed a new plant at Bogalusa, La., for the production of drilling mud and filter and bleaching clays. The equipment in this modern new plant includes a 40-ft. rotary drier, a Williams hammer-mill, a Raymond 5-roller high-side mill with a Whizzer separator, a Raymond flash-drying system, etc.

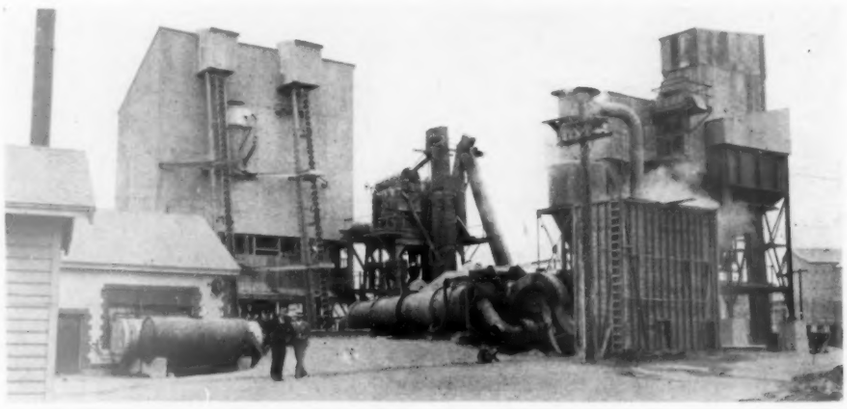
A new plant with two Gruendler hammer-mills was built by the Georgia Coating Clay Co. at Macon, Ga. Louisville driers and Raymond equipment were also installed in this plant, and in the new plants of the Sgoda Corp. at Phillips, Ga., and the Champion Paper & Fiber Co., at Sandersville, Ga. A new oil-well clay plant with a Raymond mill was built by the Beaumont Cement Sales Corp. at Villa Platte, Tex. Quality Earths, Thomasville, Ala., built a new plant. New equipment in the plant of the Filtrol Corp., Jackson, Miss., includes a Research Corp. Cottrell precipitator, a Raymond mill, a Jeffrey hammer-mill, and other equipment. The California Kaolin Co. plans to erect a $10,000 plant at Lone Pine, Cal. The Earthen Products Co., Houston, Tex., completed a $25,000 reëquipment and expansion program.

The Manufacturers Mineral Co., Seattle, Wash., bought a jaw crusher. The American Silica-Sand Co., Chicago, Ill., bought a Marion 1¾-cu.yd. shovel. The Great Lakes Foundry Sand Co., Detroit, Mich., bought a ¾-cu.yd. Northwest crane, a 6-cu. yd. Le Fourneau Carryall, a Caterpillar tractor and a Williams clam-shell bucket.

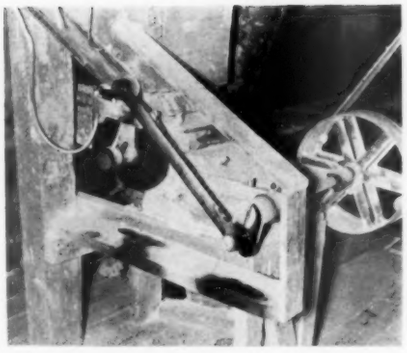
The Mid-Co. Products Co., Kansas City, Mo., bought a vibrating screen and a drag-scraper hoist. A small new plant was also built at Edison, Neb., with two Tyler vibrating screens.

The American Diatomite Corp., Clermont, Fla., installed a hydraulic press, new kilns and other equipment to double its capacity. The Michigan Silica Co., Rockwood, Mich., added new washing equipment. The Diatomaceous Earth Co., Walteria, Cal., rebuilt its light-weight aggregate plant.

The Armour Fertilizer Works added fifteen 4-cu.yd. Western dump cars and a locomotive at its phosphate operations at Columbia, Tenn. Considerable equipment was installed by the Georgia Kaolin Co., Dry Branch, Ga. Symons cone crushers were installed at the plants of the Oxford Mining & Milling Co., West Paris, Maine, and the General Chemical Co., Deming, N. M.



Another view of the aggregate-bituminizing plant of the Old Colony Asphalt Concrete Co. with boiler-house at left, new wet dust-collector box at right.



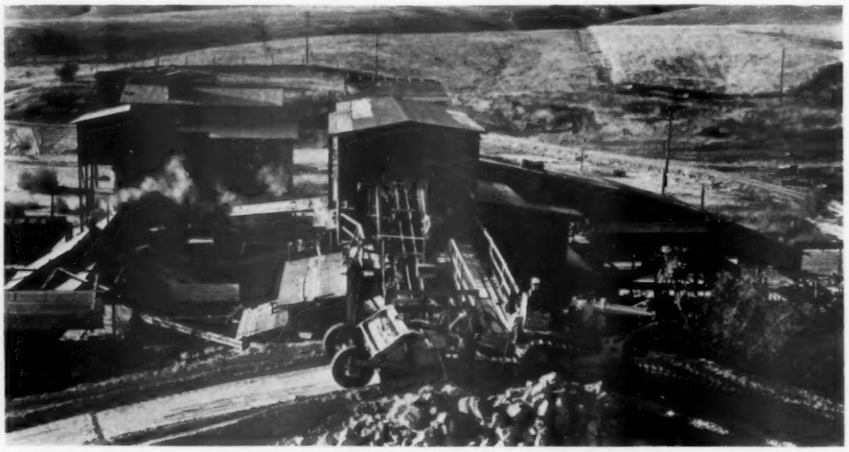
Ratchet drive of mill feeder in Eastern Magnesia Talc Co. plant is controlled by sound.

An indirect-heat Hardinge Ruggles-Coles drier was installed in the plant of the Barnsdall Tripoli Co., Grants, N. M. The J. E. Baker Co. installed a 5-ft. Hardinge mill in its Billmeyer, Pa., plant for grinding dolomite rock without the use of a drier. Pre-heated air in the mill removes the moisture and a counter-current classifier delivers the product to an overhead bin.

Basic Dolomite, Inc., at Maple Grove, O., made an unusual installation consisting of a Stephens-Adamson skip-hoist with a two-compartment bucket. This skip elevates two materials from two rotary coolers into two 950-ton Chicago Bridge & Iron Co. circular steel bins. An automatic control system always measures and places the same amount of materials in the bucket. A Symons crusher was also installed.

At its Bettsville, O., plant Basic Dolomite, Inc., made a rather unique pitch and coal storage-and-processing installation. Coal and pitch are unloaded from cars into a track hopper. The material is then sent either through or around a crusher to a Stephens-Adamson Redler conveyor. A Redler elevator running vertically through the center of the

(Continued on page 79)



The same tools that strip overburden at the Crystal Silica Co., Los Angeles, Cal., are used to haul the sand to the washer. The tractor and scraper work 17 hours a day on 1.3 gal. of 6-c. fuel an hour. The company's product is used principally for sandblasting and as an ingredient in stucco.

By RALPH K. ANDRIST

A PROGRESSIVE RURAL GRAVEL PLANT

The Spring Gravel Co. plant with loading bins beneath.

The dry-screener built by the company in its own shops.

View of operations in the pit.

THE Spring Gravel Co. of Crookston, Minn., is interesting, not because of its size, but because it exemplifies the smaller progressive gravel plant of a predominantly rural community.

The gravel pit is located at Melvin, Minn., about 15 mi. from the company's offices in Crookston. The deposit is part of a long gravel ridge several hundred miles in length, the beach of a glacial lake. This ridge, in spite of its great length, is broken up by large areas where the gravel is commercially useless because of the large sand or silt content. This fact, together with the circumstance that beyond the ridge the entire Red River Valley is underlaid with silt and clay with only a few minor gravel deposits, makes the usable sections of the ridge represent the nearest supply for a large area. The width of the ridge is moderate, averaging about 1,000 ft.

The Spring holdings vary in depth from 15 to 28 ft. The overburden of dirt is shallow, running from 1 ft. to 30 in., with the average about 18 in. The material in the deposit runs about 60 per cent. sand and pea rock, and 40 per cent. rock, although there is considerable variation, with no bowlders of any size because of the selective wave action which laid down the ridge. The workings are divided into two separate parts by intervening holdings.

The stripping operations are carried out with a 1¼-cu. yd. Northwest gasoline drag-line. Wherever possible, the stripping is cast into a waste part of the pit, but where the distance is too great for casting, trucks are used to carry off the waste. The company uses six 1½-ton Ford trucks, although the common working load is around 4 tons.

Digging is done with four Osgood ¾-cu. yd. steam shovels. In the main section of the pit two methods are used for moving the gravel to the plant: the Ford trucks mentioned above, and a 36-in. gage industrial railway, using a Porter steam locomotive and Western 4-cu. yd. dump cars. However, the firm has found that trucks give so much more flexible operation that the railway is preferable only when working at a considerable distance from the washer; the past season it was not used at all.

The trucks or cars dump the gravel into a 15-cu. yd. hopper (also equipped with standard-gage track for gondolas from the other section of pit), which feeds a short 5-ft. by 20-in. Link-Belt

Pump house with earthen dam and water-supply reservoir at the left.

apron feeder. This discharges on a closed-circuit Link-Belt belt-conveyor, 20 in. by 60 ft., which delivers into a round scalping screen, 40 in. in diameter by 6 ft. This scalper was made in the company's own shops. A wide range in specifications between W.P.A., state, county, and individual contractors necessitates frequent changes in the screen size of the scalper, and the outfit was constructed so as to facilitate these changes.

The oversize from this scalper passes through a 9-in. by 36-in. Universal crusher, and the tailings from the crusher are taken by a 20-in. by 40-ft. belt which is carried on Pioneer idlers and drops them on the original closed-circuit belt to pass through the scalper again. Thus all the oversize remains in the circuit until the crusher has reduced it sufficiently to pass through the scalping screen.

Material passed by the scalping screen is fed to a 20-in. by 220-ft. belt-conveyor which is carried on Diamond idlers on a wooden trestle into the tower. All machinery in the tower is inclosed.

Looking up the conveyor towards the plant.

In the tower the belt-conveyor discharges the gravel to a company-made washing table under three rows of jets, before dropping it to a 3-ft. by 8-ft. Jigger 3-deck vibrating screen, where the proper sizes are made. The screen cloths used vary, of course, with the specifications of the current contract being filled, with the exception of the top cloth, which is used merely to break the load. The finest screen used is an 8-mesh 17-wire.

The sand is washed through a double-screw Telsmith sand tank, while the coarse aggregate passes through a coarse scrubber screen. This screen was formerly a Babcock, now obsolete, but was rebuilt in the company's shops.

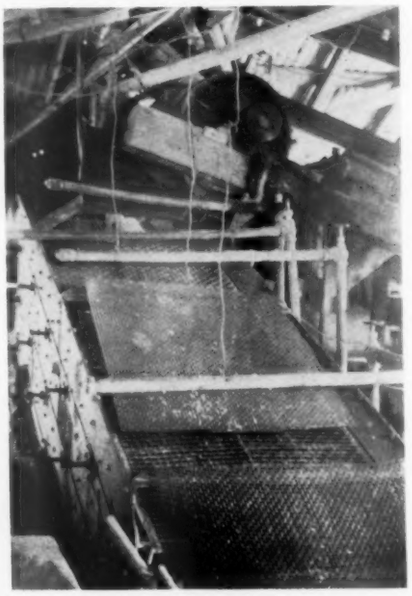
From these washers both the sand and the coarse aggregate drop into the bins below. Water for the entire plant is supplied by surface water, impounded by an earthen dam, and is pumped through a Diesel-engine-driven centrifugal pump.

Portable conveyor which is fed by the dry-screener.

All the power for the plant is supplied by a 55-kw. Fairbanks-Morse direct-current generator powered by a 75-hp. Fairbanks-Morse Diesel engine. Electricity from this generator runs all the machinery, screens, crusher, etc., through individual electric motors ranging from 2 to 15 hp. The single exception is the water pump, which is run by an auxiliary 25-hp. Fairbanks-Morse Diesel engine.

The tower has seven bins: two for sand, two for pea rock, and three for rock. The discharge chutes of the bins are 15 ft. above the ground, so that the bins may be discharged into standard railway gondolas on the siding immediately beside the tower. In these it is shipped, or moved a short distance down the siding to the stock-piles and unloaded. Unloading and loading from the stock-piles are done with the same Northwest drag-line used for stripping, but equipped with a clam-shell bucket. During the season, of course, sizing is done according to the contract being filled, but in building the stock-piles it is necessary for the company to attempt to anticipate demands during the winter, often a difficult task.

The operations described above are carried on in the main section of the pit, where the washer is located. Last spring the company installed a dry-screening outfit in the other part. In this other section, about a mile from the washing tower, the deposit runs a higher percentage of sand and pea rock, around 70 per cent. When this gravel was run through the washing tower, it was necessary to load gondolas, shunt them down to the tower, and put the gravel through the plant. A great waste was frequently involved in this process, since the sand and pea rock are often a drug on the market, to such an extent that last year more than 400 carloads of it were given to the railway for ballast. It was to cut down the expense of so much handling of a non-paying aggregate that the dry screener was built.



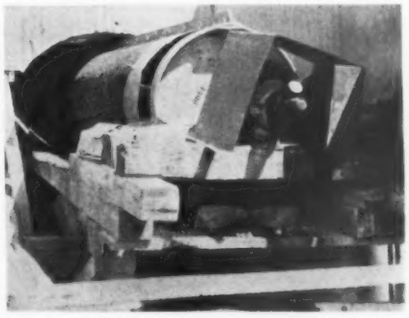
Triple-deck vibrating screen in the tower.

The entire outfit was built from the ground up in the company's own shops, making use of experience gained

in previous operation of an improvised dry screener. As a base the track from a Holt 120 endless-tread tractor was utilized to provide easy movement over soft gravel. On this is built the frame carrying the screens and the power-plant. The screen is a 3-ft. by 10-ft. 3-deck vibrating screen, made by the Diamond Iron Works. The power is furnished by a 50-hp. Sterns gasoline engine, although later the substitution of Diesel power is planned. Besides powering the screens and conveyor belts, this engine runs a 20-kw. Lincoln generator.

Excavator which is used for loading, stripping and rehandling material.

A 24-in. by 30-ft. belt running on Link-Belt idlers feeds the screens; a hopper on the end of it takes the gravel from the shovel. The fine sand and pea rock are passed by the screens, and fall on another 24-in. by 30-ft. Link-Belt belt-conveyor which discharges them either into a gondola or on a portable conveyor for stock-piling. These two belts, allowing for the overlap, give an overall travel of about 50 ft. to the screener. The coarse aggregate drops from the screens into a hopper to be taken by trucks or a portable conveyor.



The coarse scrubber screen.

A portable conveyor was also built to supplement the screener. Supported in the center on the treads and base taken from a 5-ton Holt endless-tread tractor, it can be rotated through a full circle. The belt is 24 in. wide by 60 ft. long, and is driven by a 10-hp. electric motor which runs from the generator on the screener. When one end of this conveyor is anchored to the sand-delivery belt of the screener, the other end gives adequate clearance for stock-piling, and by merely hitching the power to the base and pulling it a few feet the stock-pile end is swung into a new position. When loading sand directly from the delivery belt into gondolas, the conveyor is used to feed the screener. This conveyor, together with several small portable conveyors, gives great flexibility of operation to the dry screener.

The shovel used in this part of the pit is also an Osgood steam machine.

The firm also sells a large amount of bank-run gravel. In this area the main demands for gravel are for gravel-top and bituminous-top surfacing of roads, railway ballast, and general construction.

The plant is on a siding of the Northern Pacific Railway which, crossing over the Great Northern line less than 10 mi. away, gives good railway shipping facilities, a fact more worthy of notice here than in a more urban area served by a number of lines.

Gypsum, Etc. (from p. 76)

silo is used to store the material or feed the pulverizer.

There was also considerable activity in many other nonmetallic-minerals industries. The Arkansas Bauxite Corp. erected a new plant alongside its older one, which was also improved during the year. The Barton County Rock Asphalt Co. added new equipment. The Potash Co. of America installed equipment to double the capacity of its plant at Hobbs, N. M. The Patuxent Diatomaceous Refractories Co., Dunkirk, Md., built a new plant. The Northwest Magnesite Co., in co-operation with the U. S. Bureau of Mines and Washington State College, is erecting an experimental magnesite plant at its Chewelah, Wash., operations to use power from the Grand Coulee Dam. A pilot plant is already in operation.

Revise Specifications for Calcium Chloride

Revisions of specifications for curing concrete with calcium chloride as a dry admixture for high-early strength and cold weather concreting and as surface treatment for pavement curing, have recently been adopted as standards by the American Society for Testing Materials.

The new specifications (A. S. T. M. designation C82-38) cover the use of dry-flake calcium chloride, as well as the solution form, by simply adding 1 to 2 lb. of calcium chloride per bag of cement used, placed in the skip with the aggregates, before mixing. This will unquestionably prove of most practical advantage in concreting when special provision must be made for high-early strength and cold-weather construction.

Specifications for surface curing of pavements (A. S. T. M. designation C82-38) allow the use of 1½ instead of 2 lb. of calcium chloride per square yard, to be spread over the surface following a minimum of 12 hours of wetted burlap and sprinkling.

It is of interest that since 1931 calcium-chloride curing specifications have been included and developed with extensive research and practical usage in A. S. T. M. Standards.

The calcium-chloride stabilizing machine owned by E. P. Brady processing material for use on Michigan state highways in the immediate vicinity.

LIME-INDUSTRY DEVELOPMENTS OF 1938

THE lime industry in the first few months of 1938 suffered a slight loss of business compared with the same period of 1937, but the rapid increase in construction, especially of homes and small buildings, in the latter part of the year brought an increase in demand. The high level of production in other industries using lime also makes it seem probable that the production of lime and natural cements in 1938 was little if any below that of the preceding year.

The lime industry in the past year offered no such spectacular new rotary-kiln plants as those put in operation in 1937 by the Bluff City Lime & Stone Co., the Chemical Lime Co., H. E. Millard, and the Westvaco Chlorine Products Corp. Actually few new lime plants were built and none of these ranked in importance with those mentioned above. Expenditures in this field were devoted mainly to the improvement of existing plants.

The year saw the first successful plant for the production of CO_2 gas and dry ice from the kiln gases of an existing commercial lime plant. This plant was built by Alabama Carbon Dioxide Ice, Inc., and uses gas from the plant of the Alabaster Lime Co. at Alabaster, Ala. A capacity of 15 tons of ice daily is obtained by using gas from one of the three vertical lime kilns, each of which has a daily capacity of 15 tons of lime.

The operations of the Cummer Lime & Mfg. Co. at Kendrick, Fla., which include new lime, lime-rock and concrete-products plants.

The plant of the Century Cement Co. at Rosendale, N. Y., with new storage silos at left.

The plant of the A. J. Snyder Lime & Cement Co., Rosendale, N. Y., which was rebuilt after having been completely destroyed by fire.

The Alabaster Lime Co. also improved its lime plant during the year by installing a Sturtevant rotary crusher, an elevator, a 250-ton storage bin, and several new kilns.

A new lime and dry-ice plant was built by the Hawaiian Gas Products Co., Honolulu, Hawaii, where the year-round warm weather creates a good market for this product. The lime plant was designed by the Lime & Hydrate Plants Co., which also supplied most of the equipment. The Kuntz kiln is 11 ft. in diameter and 50 ft. high and is equipped with an automatic skip-hoist, which discharges into the kiln through a bell-sealed hopper. The kiln can be fired with either oil or gas, or both, and has a capacity of 25 tons of lime daily. Burned lime is drawn on a pan-conveyor feeding a Sturtevant crusher. The lime is fed from a bin into a 3-ton-per-hr. Kuntz continuous hydrator, which is equipped with an automatic feeder, automatic dust control and other features to eliminate impurities. An elevator feeds the hydrate to a cyclone-type separator from which the "rejects" are passed through a beater mill and returned to the hydrator.

A fan draws the CO_2 gas from the kiln to the scrubbers and other machinery in the dry-ice plant. Provision is made for three more kilns, one of which is to be added soon. As the plant is located in the heart of Honolulu special precautions were taken to make it absolutely dust-proof.

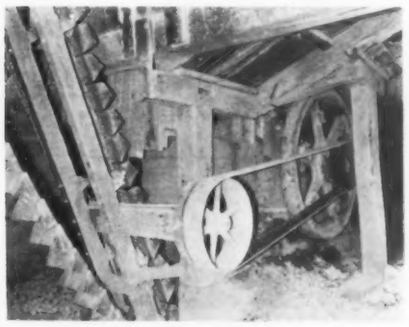
One of the most important developments of the year was the new plant of the Cummer Lime & Mfg. Co. at Kendrick, Fla. A complete line of lime products is produced, including a new type of masonry building unit. On the property is a modern office building which also houses a well-equipped chemical and testing laboratory. Actually this operation comprises three plants for the production of crushed stone, lime, and concrete products.

The lime plant was supplied by the Lime & Hydrate Plants Co. and is of welded-steel and reinforced-concrete construction. All the equipment is driven by individual electric motors which can use either commercial or plant-generated current. The kilns have a capacity of 40 tons of quick-lime daily. The quick-lime is crushed, elevated, and conveyed to the packers and loading equipment or into a bin feeding the Kuntz continuous hydrator. Elevators

New screening and storage building of the Louisville Cement Co. at Milltown, Ind.

feed the hydrate through a series of separators into a storage bin from which it is placed in sacks.

The A. J. Snyder Lime & Cement Co., Rosendale, N. Y., rebuilt its lime plant, which had been destroyed by fire. The mine and the nine 24-year-old stone shaft kilns were undamaged. Stone for the lime plant is mined about 20 ft. below the surface and is hauled in trucks up a hill, from which it is dis-



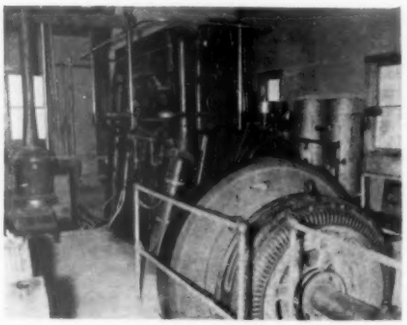
Primary crusher and elevator in the plant of the A. J. Snyder Lime & Cement Co.

charged into the mixed-feed kilns. This stone can also be dumped into the crusher for the production of pulverized limestone and crushed stone.

The lump lime is withdrawn from the 10-ft. interior diameter by 65-ft. kilns into buggies. A Jeffrey No. 2 hammer-mill reduces the lump lime, which is then elevated to a bin feeding the weighing hopper of the Clyde 1-ton hydrator. The hydrate is passed through a Raymond beater mill fitted with a cyclone into a bin feeding a 2-bag packer. Agricultural, masons' and waterproof hydrates are produced. No effort is made to sell quick-lime.

When pulverized limestone is being made, the product of the Farrel-Bacon jaw crusher is elevated into bins feeding the same Jeffrey hammer-mill. This product is then elevated to a bin feeding a Bradley Griffin mill and a new Bradley Hercules mill. The elevator, bin and bagger are those used for lime. A Hardinge mill is also used for making special products. Power for this plant is supplied by a General Electric 120-kw. alternator driven by a De La Vergne Diesel engine.

Some of the rock used in the plant

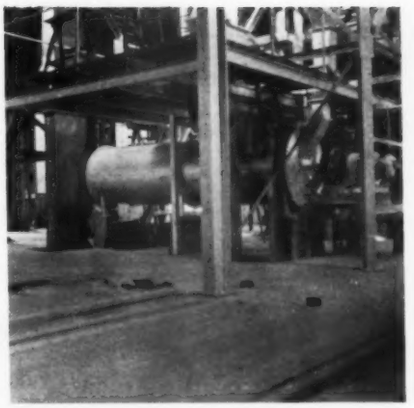


The Diesel-generator set which supplies power for the Snyder lime plant.

of the affiliated Century Cement Co. is also obtained from this mine and is burned in the lime kilns as the cement plant kilns do not have sufficient capacity. This level is 100 ft. below the surface and rock is hauled to the top of the kilns by a car and hoist. This material is drawn from the kilns on a platform and loaded into railway cars for haulage to the masonry cement plant which is about 3 mi. away.

At the cement plant this material is discharged into a track hopper, from which a pan-conveyor feeds it to a Jeffrey hammer-mill, whose product is elevated to a bin. The product of the cement-plant kilns is carried by a tramway to the bins. A blend of the two types of rock is used in the manufac-

New grinding mill in the plant of the A. J. Snyder Lime & Cement Co.



Part of the new hydrating plant of the Hawaiian Gas Products Co., Honolulu.

ture of masonry cement. The capacity of this plant has been increased from 1,000 bbl. to 2,500 bbl. by the installation of a second Smidth tube-mill and a Bradley Griffin mill.

The Austin White Lime Co., Austin, Tex., installed a 220-hp. Fairbanks-Morse Diesel-electric unit. Fans, motors, pumps, a hoist and a bag-packer were installed by the Moores Lime Co., Springfield, O. Three Hardinge feeders were installed by the New England Lime Co., Adams, Mass.

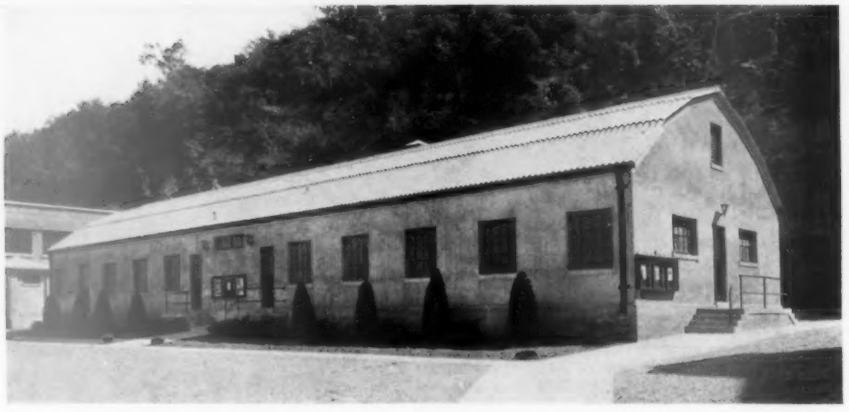
The Louisville Cement Co. installed a Stephens-Adamson Redler conveyor-elevator in its Milltown, Ind., lime plant to carry lime dust from the screens to overhead storage. A 4-ft. Symons short-head cone crusher was also placed in service. The Kelley Island Lime & Transport Co. made many improve-

Kiln and drawing floor of Hawaiian plant with part of CO_2 equipment in background.

ments to its plant at Gibsonburg, O. The Fort Scott Hydraulic Cement Co., Fort Scott, Kan., bought two Fruehauf trailers with International tractors for making cement deliveries.

The Chubbuck Lime Co. installed a new rotary kiln in its plant at Amboy, Cal. The Oregon Lime Products Co., Williams, Ore., installed a Kuntz hydrating system and built an additional vertical kiln. Two new vertical kilns were erected by the Cheney Lime &

(*Continued on page* 83)



At the left, top to bottom, are: Fig. 1, the service building at the Prospect Hill plant of the Missouri Portland Cement Co.; Fig. 2, a similar structure at the Sugar Creek plant and; Fig. 3, the service building at the Fort Bellefontaine quarry.

SERVICE BUILDINGS FOR THE EMPLOYEES

THE recent completion of a service building at the Prospect Hill plant of the Missouri Portland Cement Co. provides workmen and foremen with centralized facilities for personal hygiene and comfort. In addition to shower-bath, toilet and clothes-locker facilities, the building contains a completely equipped first-aid dispensary and medical examining room, a conference meeting room for foremen, and a clock room.

An exterior view of the building is shown in Fig. 1. Exteriors of the service buildings at the Sugar Creek plant and the Fort Bellefontaine quarry are shown in Figs. 2 and 3. All contain similar equipment and have the same general type of construction except the roofs.

The first-aid room and foremen's meeting room have outside entrances with connecting doorway between. Complete equipment for first aid, emergency cases and physical examinations is provided in the first-aid room together with desk and file cabinets and shower and toilet facilities as shown in Fig. 4. The adjoining foremen's meeting room serves when necessary as a convenient waiting room during employee physical examinations. It is used primarily as a conference meeting room and as an office for preparing plant reports and records. Leading from this room and completing the end unit of the building is the foremen's dressing room, containing a shower stall, lavoratories, a commode, and a urinal. Lockers are two-compartment units with shelves, 18 in. by 18 in. by 72 in., and are set on concrete walls forming a hollow box. Locker ventilation is described later in this article.

Forming the main entrance to the accommodations for white and Negro workmen is the clock room. The time clock and its card racks are on the outer wall and the bulletin boards on the opposite wall. Entrances to separate service rooms for white and Negro workmen are at opposite ends of the clock room and in the center is a janitor's closet in which lighting control switches are located.

The service rooms contain wash, shower, locker and toilet facilities divided by partitions. The wash room for white workmen (Fig. 5) forms a main hall through the service room with entrances on each side of the building. Bradley concrete wash-fountains in semi-circular pattern are arranged along one wall with ample space to avoid congestion. The valve on each wash-fountain is operated by foot pressure on a bar. The water temperature is controlled by a regulating valve inside the fountain pedestal.

Eight pressed-steel shower stalls are arranged to form the shower-room for white workmen (Fig. 6), where privacy may be had while using the showers. Although each shower has separate valves for hot and cold water, the water is tempered by temperature-regulating valves to eliminate the danger of scalding. Rubber mats with perforations and grooved under surfaces for drainage are used in all the showers. These are routinely cleansed, sterilized and exposed to the sun as a sanitary measure. Concrete benches and towel hooks are provided along the walls opposite the showers.

The toilet rooms are adjacent to the wash rooms and are equipped with facilities of the most modern design. China urinals flush automatically and have an abrasive-surface tile-floor approach. Lavoratories are equipped with mixing faucets but no drain plugs. This

Fig. 4. First-aid room.

Fig. 5. The wash-room.

requires the hands to be washed under running water resulting in better sanitation and cleaner basins.

The locker rooms (Fig. 7) are arranged with a central corridor extending from the wash rooms. The lockers are 18 in. by 18 in. by 60 in., two-compartment (one vertical partition and shelf) and are placed on colored-concrete benches. These are of sufficient width to provide a seat in front of the lockers. The bottoms of the lockers are 1 in. above the seat to prevent penetration of the felt seal strip by water when the benches are washed. A hollow space under each row of lockers is formed by the bench walls, and this air space is connected by an air-duct to the main air- and pipe-ducts under the building floor. These main ducts open into the basement, where a large air-duct is connected to an exhaust fan in the attic. With air-vents on the locker doors and perforated locker bottoms individual forced ventilation of each locker is accomplished.

The attic exhaust fan is a No. 3 American H. S. fan, with a capacity of 2,400 c.f.m., directly connected to a ¾-hp. motor running at 1,160 r.p.m. This fan also exhausts air from the workmen's toilets, wash-fountains and showers through grills in the ceiling over these fixtures.

Air is exhausted by positive pressure from the first-aid room, the foremen's meeting room, and the foremen's dressing room.

With this ventilating system an air change every 7 to 10 min. is secured in all rooms except the toilets, where the air change occurs every 4 to 6 min. This system of ventilation maintains a slight positive pressure in the rooms, which prevents dust being carried into the building by infiltration around the doors and windows.

The entire building is heated by venturafin unit heaters with thermostat control to maintain a constant temperature. The heaters operate on 5-lb. steam pressure, steam being furnished by the plant's main boiler room. Thermostats controlling the unit heaters have a temperature range from 60 to 100 deg. F. during hot weather, and the unit-heater fans operate continually for air circulation and cooling.

Hot water is supplied by a Sims storage type water-heater, installed in the basement, with a capacity of 1,970 gal. per hr. for a temperature rise of 140 deg. F. at 5-lb. steam pressure. The water-heater is controlled by a thermostat-operated steam valve that maintains a water temperature of 180 deg. F. Hot water passes through temperature-regulating valves in the supply lines to the showers, wash-fountains and lavatories to eliminate the scalding of workmen as previously mentioned.

Monolithic concrete construction was used for the foundations, basement, pipe and air tunnels. The walls are of concrete masonry wtih their exterior surfaces stuccoed. The interior walls are covered with cement masonry plaster.

The floors are of reinforced concrete with a colored-concrete floor topping constructed to drain into an ample number of outlets for quickly carrying away water when washing the entire interior of the building with a water hose.

The ceiling construction utilizes the Olsen Ambler system, consisting of ¼-in. thick asbestos-cement sections supported by special formed metal trips at 24-in. centers with the same type of metal strip placed at right angles at 8-ft. centers, forming a paneled ceiling with panels 2 ft. by 8 ft. in size. The ceiling is suspended by using metal clips inserted in the special metal strips and fastened to steel trusses and ceiling joists.

The roof consists of asbestos-cement corrugated sheeting placed on a steel roof structure.

Steel sash and doors are used throughout. The steel sash is ventilated in the toilets, foremen's rooms and first-aid room and is used to exhaust more air from these rooms during very hot weather and congested periods. The necessity for window ventilation is eliminated in other rooms by the type of ventilating system installed.

Fig. 6. Shower room.

Fig. 7. Locker room.

Semi-direct lighting is used throughout the building.

The building was constructed in accordance with a design and specifications prepared by the engineering department of the Missouri Portland Cement Co., under the supervision of M. C. Addicks, assistant to the operating manager.

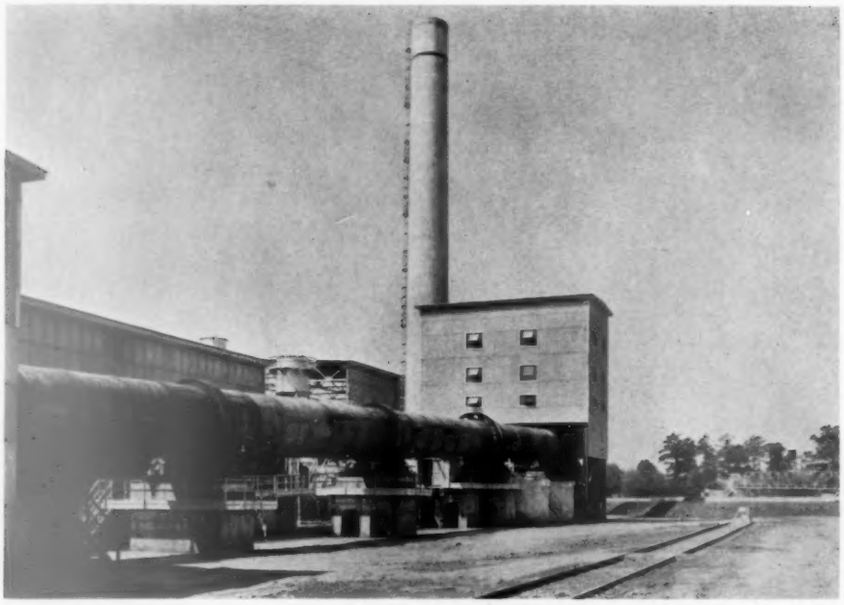
Lime in 1938 *(from page 81)*

Cement Co. at Landmark, Ala. A Roto-clone dust-collector was added by the Diamond Springs Lime Co. at Diamond Springs, Cal.

The Harris Lime Co., Saylesville, R. I., installed a Sturtevant sledge mill. A Pangborn dust-collector went into the Le Gore, Md., plant of the Le Gore Lime Co. S. W. Barrick & Sons, Woodsboro, Md., installed a bagging machine and a Stedman pulverizer, and the addition of a hydrator is contemplated. The Staunton Lime Co., Staunton, Va., installed a drier to make agricultural lime of calcium-carbonate refuse.

A number of lime plants are being operated by counties and municipalities to supply agricultural lime for local use, but none of these compare with the $100,000 plant proposed by Oklahoma City, Okla. This plant would make lime from the waste sludge from the city waterworks filtration plant.

Cement Industry's Advance Revealed in Plant Developments of 1938



New kilns, kiln-feed building and stack at the Leeds, Ala., plant of the Universal Atlas Cement Co. The raw-material storage building is in the background.

The two 200-ft. diameter thickeners which dewater the slurry at the Leeds plant before it is fed to the kilns.

THE year 1938 saw the cement industry recovering rapidly from the falling off in demand which began in October, 1937. All indications point to a continuance of this upward trend, at least for the first half of 1939. Expenditures for actual building construction increased during November to the highest monthly valuation since late in 1931, and were 2.5 per cent. over those of October, 1938 and 17.4 per cent. over those of November, 1937. Engineering-construction awards for the year exceed the 1937 total and in recent weeks have been nearly double those for that year. This is an encouraging factor, because Portland cement has been the most sluggish of the important building materials in responding to the upturn in construction activity that began some months ago. This sluggishness can be attributed in large measure to the fact that heavy construction, which absorbs a major part of cement tonnage, had lagged behind residential building.

Shipments of Portland cement, after falling below the level of the same month in the preceding year for twelve consecutive months, in October registered an increase of over 10 per cent. The total reached in that month, 12,537,000 bbl. was the highest since September, 1937. November sales were below October's, but remained nearly 5 per cent. over the November, 1937 level. Indications are that December shipments equaled, or slightly exceeded, those of December, 1937. If this be the case, total shipments for 1938 will be about 108,000,000 bbl., only about 7 per cent. under the 1937 total of 116,720,000 bbl. and only about 4 per cent. under the 1936 shipments.

The outlook for road building, an-

The raw-material grinding department of the Leeds plant showing the arrangement of the mills and classifiers.

other important outlet for cement, was improved during the year by a growing popular sentiment against diversion of automotive tax funds for other purposes. Three states, California, New Hampshire and Michigan, adopted constitutional amendments at recent elections to stop such diversion. Five other states prohibit diversion and movements are under way in many other states to end this practice. Even in states not prohibiting diversion, popular sentiment has had its effect by reducing the amount of diversion.

The cement industry in 1938 continued to devote its attention to more economical and efficient operation and most of the expenditures were made for this purpose. Many plants installed direct-firing coal mills, coolers, recuperators, and other equipment in order to reduce fuel consumption and produce a higher-grade clinker.

The new plant of the Argentine Portland Cement Co., a subsidiary of the Lone Star Cement Corp., at Parana, Argentina, is one of the most interesting

The Universal Atlas plant at Hudson, N. Y., with new storage and mill buildings at right. In the center are the raw-material blending silos.

developments in the cement industry in recent years. It is the first plant designed from the ground up to use the Breerwood process of flotation in the preparation of the material. This process made it possible to utilize a deposit which would otherwise have been unsuitable for cement manufacture and which is ideally located for water shipments. Complete descriptions of this plant and process were published in the November, 1938 issue of PIT AND QUARRY.

An electric walking drag-line with a 5-cu.yd. bucket removes the overburden and overcasts it on the quarry floor after the stone has been removed. A 2½-cu. yd. crawler dragline is used to dig the raw material, which consists of strata of clay, sand, limestone and soft rock. Little blasting is necessary. The clay underlies the rock and is hauled separately, in about the desired percentage, to a wash-mill.

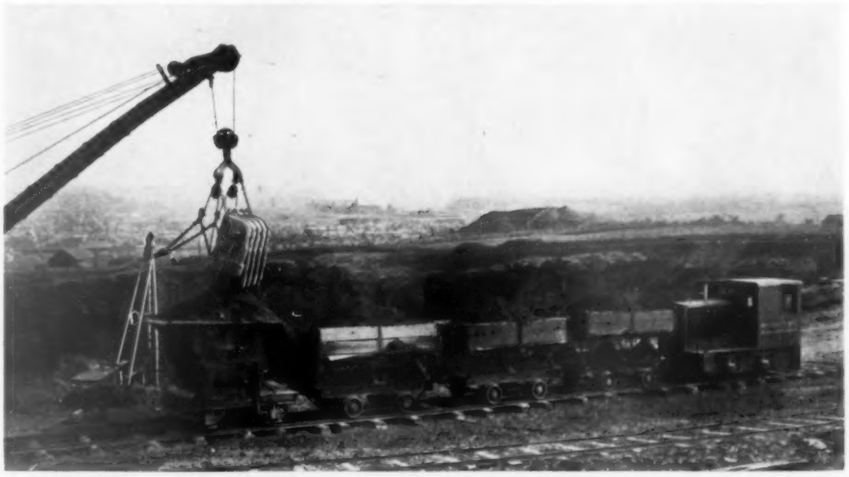
Locomotives and cars haul the rock to the crusher, where it is reduced by a swing-hammer crusher with movable breaker plates. Rock, clinker and gypsum are stored in the usual type of building with a traveling crane. Some blending of the two types of rock is done in feeding the preliminary ball-mill, which operates in closed-circuit with a bowl-and-rake classifier. The grinding is just fine enough so that no unnecessary work is done on the silica particles which are to be removed.

The flotation plant consists essentially of two 45-ft. diameter hydroseparators operating in series, a cell-house and an 180-ft. diameter thickener. The overflow from both separators goes direct to the thickener. The underflow goes to the cell-house in which are ten 56-in. froth flotation cells. These reject about 24 per cent. of the original feed to the hydroseparators and their product goes to the thickener. Careful blending at both ends of this process insures a uniform product. Clay is added in the tube-mill which does the final raw grinding.

Clinker is discharged from the 400-ft. kiln into a 120-ft. rotary cooler of unusual design. Automatic weighing feeders blend the clinker and gypsum into the 4-compartment finish-grinding mill, which has a slide-shoe bearing and can be operated in open-circuit or in closed-circuit with an air-separator. A pneumatic-conveying system carries the cement into six silos with a total capacity of 124,000 bbl. Two movable pneumatic pumps transfer the cement from the storage to the pack-house. Sacked cement can be loaded on trucks or transferred on a long belt to the dock for boat loading.

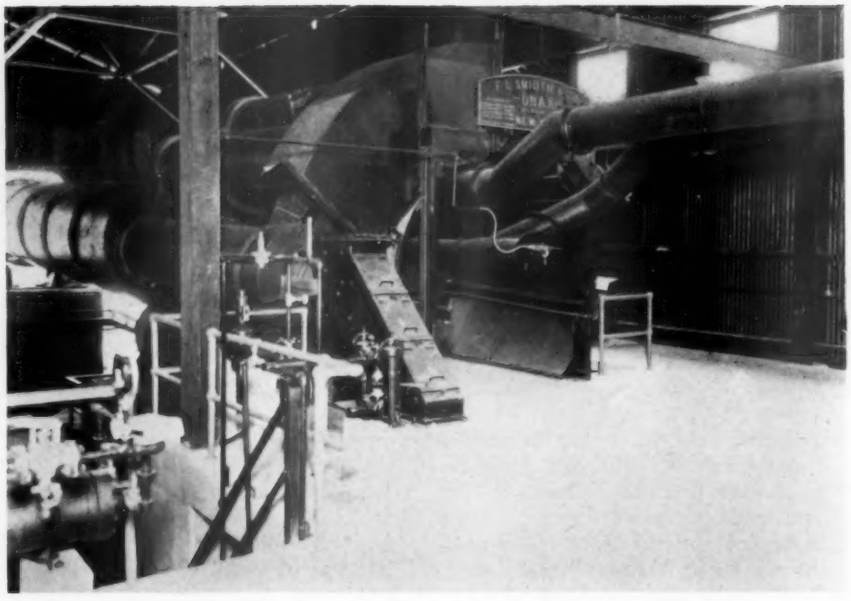
The new plant of the Gulf Portland Cement Co. at Houston, Tex., started to produce cement early in the year. This plant has attracted wide attention and is thought by many to represent a type of operation which will eventually to some extent decentralize the production of cement. Although small, this plant is compact and well laid out. It was designed for a capacity of 800 bbl. daily.

The new plant of the Gulf Portland Cement Co. Shell and clay are unloaded from barges at the dock in the foreground.



Locomotive and cars used to haul away overburden at the quarry of the Whitehall Cement Mfg. Co., Cementon, Pa.

ABOVE — Motor and drag-scraper hoist in the clay storage at the Puerto Rico plant.

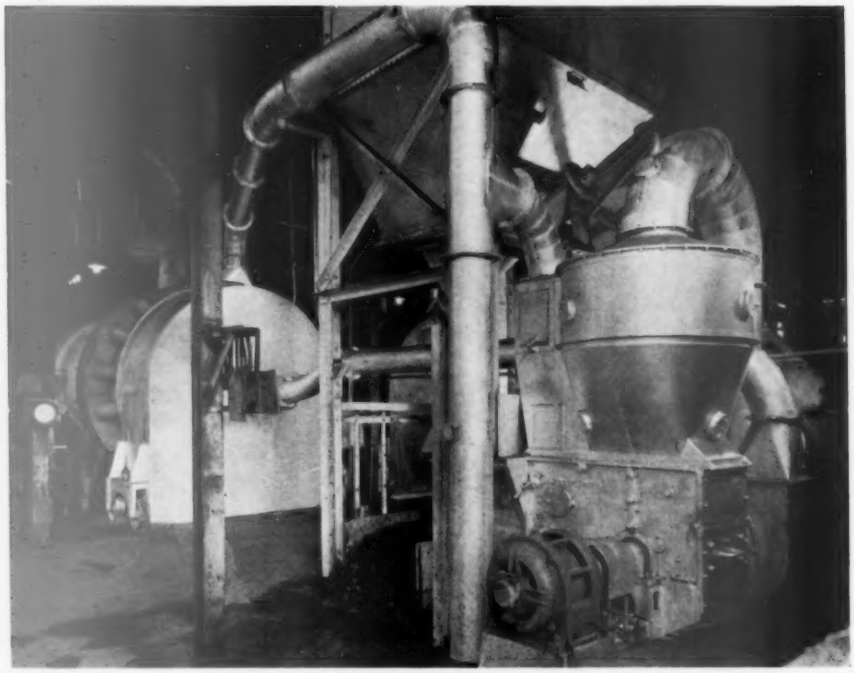


RIGHT—A view of the kiln in the new Puerto Rico Cement Corp. plant, showing the cooler, primary-air pipes and oil-firing connection.

A preliminary description of this plant before it went into operation was published in the January, 1938 issue of PIT AND QUARRY and a complete description will appear in these pages soon.

Shell and clay are used as raw materials. The shells are ground in a ball-mill which is in closed-circuit with a Jeffrey-Traylor vibrating screen. Clay from the wash-mill and the ground-shell slurry are blended by Kennedy-Van Saun Ferris-wheel feeders into the final raw-grinding tube-mill. The kiln is 220 ft. long and the clinker is discharged into a 120-ft. rotary cooler.

Jeffrey-Traylor Waytrol vibrating feeders blend the clinker and gypsum into a No. 85 F. L. Smidth Kominuter, which is in closed-circuit with a Jeffrey-Traylor vibrating screen. The final grinding is done in two 5- by 22-ft. tube-mills in closed-circuit with a 14-ft. Raymond separator which has a double set of Whizzers. Fuller rotary feeders driven by Reeves variable-speed motor-reducers feed these mills. A 4-in. Fuller-Kinyon pump feeds the cement to the 4-silo storage, which has a capacity of 35,000 bbl. A 6-in. Fuller-Kinyon portable unloader feeds the cement from storage to the pack-house. A feature of this plant is the modern, well-equipped building housing the offices and laboratories.



A coal mill firing one of the four 100-ft. kilns at the plant of the Kosmos Portland Cement Co. Shown also are the kiln-burner pipe, hot-air pipe from kiln hood, and recuperator.

The new wet-process plant of the Puerto Rico Cement Corp. near San Juan, Puerto Rico, was completed in May, 1938 after many delays. Originally planned as a private venture, this plant was finally built by the Federal government under the direction of the Puerto Rico Reconstruction Administration. The plant has a capacity which is said to be justified by the local demand. All the necessary raw materials for the manufacture of various types of cement are available, including stone, clay, iron ore and silica. Gypsum is imported from Nova Scotia. A complete description of this operation was published in the July, 1938 issue of PIT AND QUARRY.

Coal-preparation unit in the Kosmos plant with dust-collector above.

The stone is now hand-loaded in the quarry. The processing equipment includes a Pennsylvania hammer-mill and a Link-Belt vibrating screen, operating

in closed-circuit with it. An F. L. Smidth wash-mill is used for the clay. Crushed stone, clinker and gypsum are stored in a building 280 ft. long and 82 ft. wide with a 2½-cu.yd. P&H overhead traveling crane.

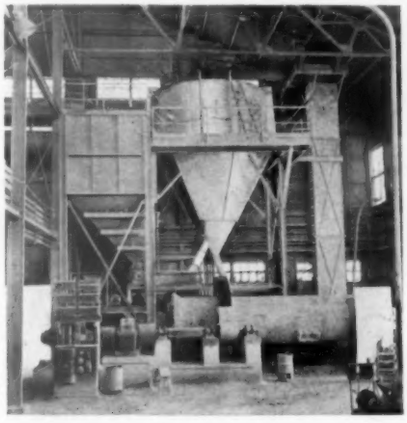
A Schaffer Poidometer feeds the stone to the Smidth 8-ft. by 29-ft. 3-compartment Unidan mill. The clay slurry is also fed to this mill and the resulting cement slurry goes to three 600-bbl. storage tanks. The Smidth kiln is 7½ ft. and 8½ ft. in diameter and 306 ft. long. It is the latest type, incorporating all modern features and controls, and has a 10-cylinder single-row Unax cooler. The clinker is discharged into storage. All the clay- and cement-slurry pumps

The three direct-firing coal mills which serve the existing kilns at the Hudson, N. Y., plant of the Universal Atlas Cement Co.

were furnished by the W. R. Wilfley Co.

The finish-grinding mill is similar to the raw mill and is in the same building. If the plant is ever enlarged, the raw mill can be converted for finish grinding. Either of two 6-in. Fuller-Kinyon pumps feeds the finished cement to the stock-house, which consists of 4 silos with a total capacity of 45,000 bbl. Sly dust-collectors were installed in the crusher, mill and packing departments.

The Marquette Cement Mfg. Co. in 1938 installed three Autocar trucks with Cummins Diesel engines and side-dump bodies to haul overburden from its quarry at Oglesby, Ill. A 12-cu.yd. Le Tourneau Carryall and a Le Tourneau angledozer mounted on an RD8 Caterpillar Diesel tractor are also used for



The clinker-grinding department of the Gulf plant. The two mills operate in closed-circuit with the separator.

stripping. It now has under way the last step in the modernization of this quarry. Four Autocar trucks with Cummins Diesel engines will be used as tractors, one being kept in reserve. Each truck will haul two 22-ton trailers, one being loaded while the other is in transit. These trucks will haul to the plant through a mine tunnel which will be ventilated. Bridges will be strengthened and roads will be built for these trucks. A modern wash-room was also built for the employees at the Oglesby plant with such features as terrazzo floors, chromium fixtures, ventilated lockers, etc.

At its Cape Girardeau, Mo., plant the

The white-cement grinding plant of the Meduse Products Co. at Paris, Ont.

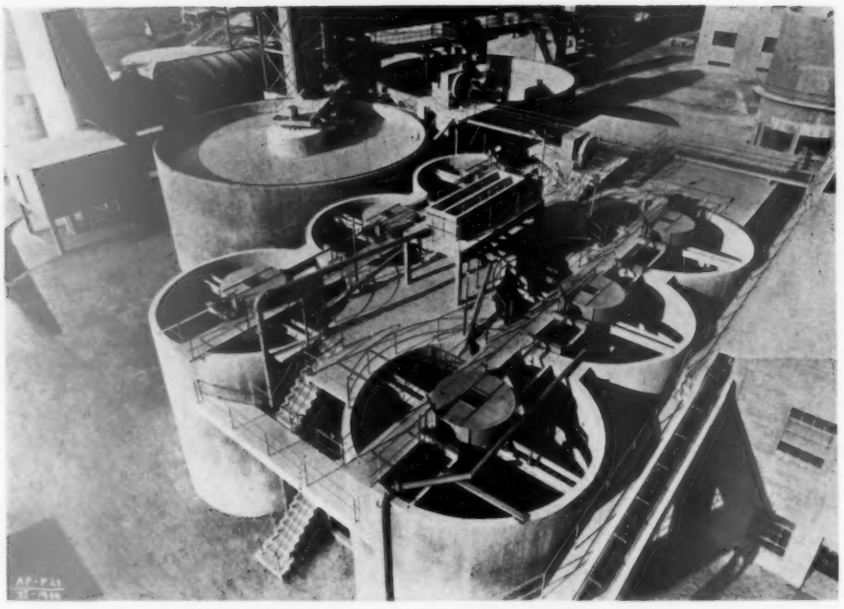
company completed the installation of a Western Precipitation Corp. Cottrell precipitator early in 1938. A raw-material control system is now being installed in the plant.

Plans are still going forward for the construction of a cement storage and packing plant at Vicksburg, Miss. A new tow-boat will be built to replace one of those now in use. The older boat will be used for hauling coal to the Oglesby plant.

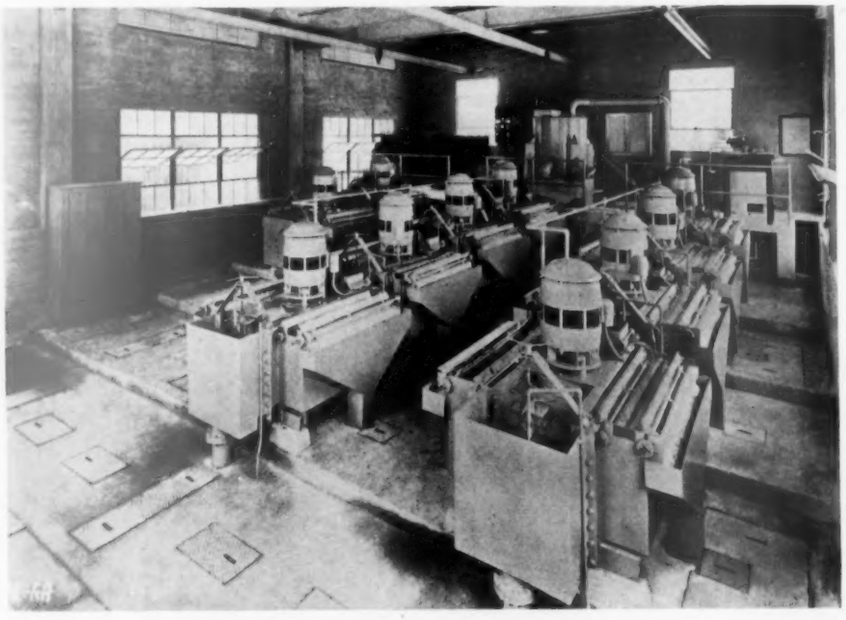
The Kosmos Portland Cement Co. completed a series of improvements at Kosmosdale, Ky., which have attracted considerable attention. Most of these improvements were made in the burning department and resulted in marked fuel economy, and increased operating efficiency, and also improved the quality of the product. Of particular interest is the new coal-grinding and feeding equipment installed. A complete description of these improvements was published in the July, 1938 issue of PIT AND QUARRY.

A new system uses six Stephens-Adamson Redler conveyors to feed the kilns. Coal is crushed by a Williams hammer-mill, and an American Air Filter Co. wet "Rotoclone" keeps this department dustless. The kilns are now

A general view of the Argentine plant from above the quarry with the thickener tank, water-storage tank, cell house and hydroseparators in the foreground. In the right background are the drag-lines and the crusher building.



A view of the Argentine plant showing the two hydraulic separators and the two slurry tanks in the foreground with the reagent water tank, the cell house and the thickener in the background.



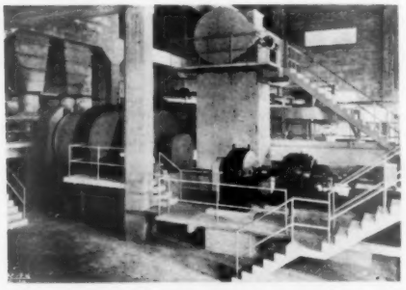
Interior of cell house in the Argentine plant. Cleaner, rougher and scavenger cells are shown with their reagent feeders.

fired by six Strong-Scott Unipulvo direct-firing pulverizers. Strong-Scott mills were also installed to fire the three clay and limestone driers, and two mills fire an auxiliary boiler which supplements the waste-heat boilers. A Buell dust-collecting system is being installed. A Union pan-conveyor, an Allis-Chalmers vibrating screen, and a 12-ft. Norblo cyclone collector were installed in connection with the clinker cooler.

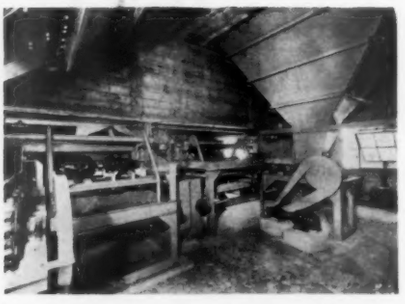
The reconstruction of the Leeds, Ala., plant of the Universal Atlas Cement Co. was completed in 1938. So comprehensive was this program that this is actually a new plant incorporating the latest types of equipment and some methods new to the cement industry in this country. This plant was built in somewhat the same way as the company's Hudson, N. Y., plant, completed last year, each old department being operated until the corresponding new department was completed. It is said to be the first plant in this country designed from the ground up for closed-circuit wet grinding.

In the quarry a 2½-cu.yd. electric shovel loads stone into the individually remote-controlled cars of a Woodford electric-haulage system. Crushing is done by a 42-in. gyratory crusher followed by a 42-in. by 66-in. hammer-mill. A belt-conveyor feeds the crushed stone to the 100-ft. by 384-ft. storage building, which is served by a 10-ton overhead traveling crane. Shale and sandstone are also stored in this building. Automatic feeders serve the two raw-grinding ball-mills, which operate in closed-circuit with bowl classifiers. The rake product goes to a second pair of mills in closed-circuit with bowl-and-rake classifiers. Two 200-ft. diameter thickeners dewater the product, each thickener being used for a different type of cement.

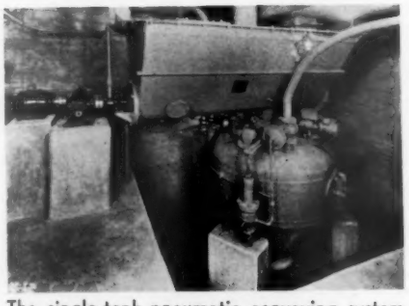
The two new 10-ft. by 301-ft. kilns are followed by air-quenching vibrating coolers. Clinker is stored in a separate building. Each of the two ball-tube mills in the finish-grinding department is in closed-circuit with a pair of vibrating screens. The final grinding is done by two 2-compartment mills, each in closed-circuit with two 16-



Interior view of raw mill at Argentine plant showing the preliminary ball-mill at left and the bowl classifier in the background.



The weighing feeders at the Argentine plant which proportion clinker and gypsum by weight into the finish-grinding mill.



The single-tank pneumatic conveying system at the Argentine plant which feeds cement to storage silos. Feed tank above reduces loading interval.

ft. separators. Pneumatic conveying systems transfer the cement to eight new silos with a total capacity of 165,000 bbl. and twelve older silos holding 65,000 bbl.

Improvements to the Hudson, N. Y., plant were described in the July, 1938 issue of PIT AND QUARRY. Although most of the improvements were completed late in 1937 several departments did not operate until 1938.

The Medusa Portland Cement Co. completed an improvement program at its Crescentdale, Pa., plant which had been in progress several years. Recent installations included a separator, mill feeders, equipment for the production of mortar cement, secondary superheaters for the waste-heat boilers, blending and kiln-feed systems and a flue-dust-collecting system. These improvements were described in detail in an article published in the October, 1938 issue of PIT AND QUARRY.

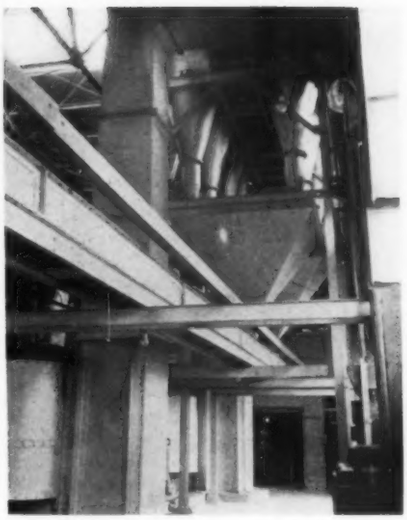
The new kiln-feed system is of the circulatory type. A Manitowoc Minogue circumferential feeder was installed on one of the four kilns. Exhaust gases now are drawn from the waste-heat boilers into the four new Buell dust-collectors, one of which has four cells or cyclones. The collected dust is carried by a common screw-conveyor and elevator into a silo. The dust can be sold to farmers or blended with the raw material as desired. The finish-grinding mills also have circulatory feed systems, and an 18-ft. Raymond separator was installed in closed-circuit with them. Jeffrey Waytrol feeders are used to proportion the lime, cement and stone to the masonry cement department.

The Medusa Portland Cement Co. also installed a Western Precipitation Corp. Cottrell precipitator in its plant at Dixon, Ill.

The Medusa Portland Cement Co. also installed Hardinge Co. Electric Ears on grinding mills in its plants at Toledo, O. and York, Pa. The installation at Toledo controls the feed to a compartment mill, which is in closed-circuit with an air-separator. At York this system controls the feed to a mill which was first operated for six months in open-circuit and was later changed over to closed-circuit with a separator. The device successfully controlled the fineness and general mill conditions in both cases.

Another installation of the Hardinge Electric Ear was made at the Hagerstown, Md. plant of the North American Cement Corp. This unit controls the feed to a 10-in. diameter by 66-in. Hardinge mill, which operates in closed-circuit with a separator. This mill is driven by a 400-hp. motor and grinds limestone to about 90 per cent. through 200-mesh. The use of the Electric Ear increased the capacity of this mill.

The 18-ft. separator in Medusa's Crescentdale plant which operates in closed circuit with the two finish-grinding tube-mills.

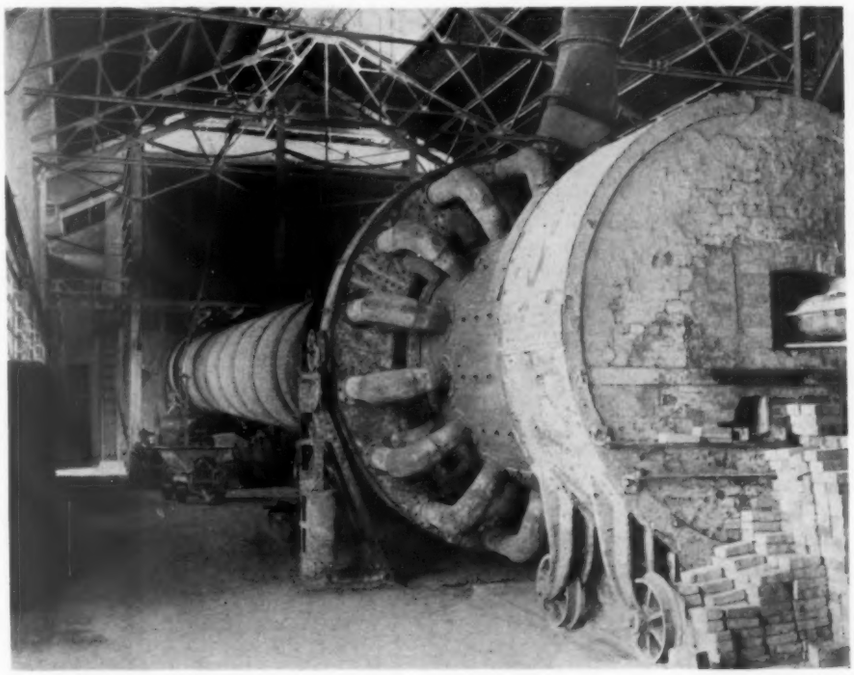


The kiln-dust-collecting system in the Crescentdale plant. Duct from one of the boilers and collecting screw-conveyor are shown.

The Medusa Products Co. of Canada, Ltd., a subsidiary of the Medusa Portland Cement Co., in June, 1938 put in operation a plant at Paris, Ont., to grind imported clinker. White cement clinker is shipped in from the company's plant at York, Pa. Waterproof white cement, "Stone Set" white cement for masonry, and cement paints are also made. The chief competition for the product of this plant is offered by English and Belgian white cements.

Clinker is received in cars and discharged to a hopper from which it is elevated to two of four bin compartments. Lime and limestone dust are stored in the other two compartments. Grinding is done in a 22-ft. tube mill fed by a Jeffrey-Traylor vibrating feeder. The mill product is discharged on a Tyler Hum-mer screen and is then elevated to bins feeding three 2-bag packers. A Raymond pulverizer is used to make waterproof powder for addition to the cement and an Abbe ball-mill is used in the manufacture of cement paints.

The year was not without its rumors of new plants to be built. Of these one in Mississippi and one in California seem at this time to be the most probable. Plans are also said to be under way for a small cement plant to be built at Ciudad Juarez, across the Rio Grande River from El Paso, Tex. A new plant is also planned by the Sociedad Anoni-



Short-plate recuperator on one of the four kilns in the Crescentdale, Pa., plant of the Medusa Portland Cement Co. This photograph was taken before operations were resumed.

ma Nacional de Cementos, Uruguay, to produce Portland cement, super-cement, white cement, and hydrated and quicklime.

The Rizal Cement Co., Inc., Manila, P. I., built an addition to its plants, increasing its capacity 2,000 bbl. daily. The Cebu Portland Cement Co., Manila, also increased its capacity and built a pier to facilitate water shipments.

Juan Minetti e Hijos, Cordoba, Argentina, installed considerable equipment in its plant at Mendoza. Included were two crushers, a 260-ft. kiln, an air-quenching clinker cooler, raw material and clinker mills, dust-collectors, etc. Most of this equipment was supplied by the Allis Chalmers Mfg. Co.

The most important improvement program now in progress is that of the Lehigh Portland Cement Co. which will be completed in 1939. The Union Bridge, Md., plant is being completely modernized and brought up to a par with other Lehigh plants. The Alsen, N. Y. plant, which had not operated since 1928, is being rebuilt and re-equipped. This plant was originally a

The tractor and scraper used for stripping at the Oglesby, Ill., plant of the Marquette Cement Mfg. Co.

dry-process operation and is being converted to use the wet process. The Lehigh Portland Cement Co. also purchased the plant and business of the Mikolite Co., Kansas City, Mo.

Numerous improvements were made to the South Dakota State Cement Plant at Rapid City, S. D. The new equipment installed included a Bradley Hercules mill and a Sturtevant separator.

The Diamond Portland Cement Co., Middle Branch, O., bought a 20-ton Plymouth locomotive. The Olympic Portland Cement Co., Bellingham, Wash., installed a Merrick Weightometer. The Pennsylvania-Dixie Cement Corp. has ordered three Fuller inclined-grate clinker coolers. A Robinson pneumatic conveying system was installed at the Penn-Dixie plant at Richard City, Tenn. The California Portland Cement Co., Colton, Cal., installed an Allis-Chalmers air-quenching clinker cooler.

The Riverside Cement Co., Riverside, Cal., installed a Sturtevant separator in the raw-grinding department and made other improvements. The Union Portland Cement Co., Devil's Slide, Utah, installed a Raymond and Sturtevant air-separators.

The Southern States Portland Cement Co., Rockmart, Ga., replaced its old 25-cycle motors with new 60-cycle motors. A new office building was also built.

The Canada Cement Co. made no spectacular improvements in the last year but devoted its attention more to minor improvements in its eight plants. Perhaps the most interesting of the improvements made was the installation at the Exshaw, Alberta, plant of an F. L. Smidth granulizing preheater on one of the six kilns. A Smidth Unax cooler will be installed during the winter.

The St. Mary's Cement Co., St. Mary's, Ont., early in 1938 completed an extensive improvement program. This included the erection of a packhouse and eleven storage silos with a total capacity of 140,000 bbl.

The Lone Star Cement Corp. also improved its plant in this country during 1938, but did not concentrate its expenditures on any one plant. At Bonner Springs, Kan., two Sturtevant air-separators were installed in the clinker-grinding department and a dust-collector was added. At Houston, Tex., four concrete cement-storage silos were built by the Nicholson Co. The plant at Spocari, Ala., was modernized and a model laborotary and office building were erected at Nazareth, Pa.

The Keystone Portland Cement Co., Bath, Pa., is installing two Fuller inclined-grate coolers and is erecting a new laboratory and locker buildings.

At the Dewey, Okla., plant of the Dewey Portland Cement Co., a new stone-drying department was installed. The kilns were equipped with a new type of magnesite lining. New grinding equipment and a dust-collecting system were also put in operation. A Caterpillar Diesel-powered Vulcan locomotive is used by the Whitehall Cement Mfg. Co., Cementon, Pa., for the removal of overburden.

The Idaho Portland Cement Co., Inkom, Idaho, installed a Raymond direct-firing bowl mill on its kiln. An Allis-Chalmers chain system was also installed. The Giant Portland Cement Co., Egypt, Pa., installed a Strong-Scott pulverizer for direct-firing a drier.

The Washington-Idaho Lime Products Co., which in 1935 built a small new plant at Orofino, Idaho, has improved its plant considerably. A recent addition to this plant was a new Williams hammer-mill secondary crusher in closed-circuit with a Tyler Hum-mer screen. A rotary cooler of the company's own design was installed. This, with other refinements in heat recovery, has effected a fuel saving of about 25 per cent. Five new concrete slurry-storage silos are now under construction. New coal unloading, handling and storage facilities and a slurry dehydrator will be installed during the winter.

Huge Phosphate Supply in Florida Estimated

In testifying before the Congressional phosphate hearing at Lakeland, Fla., in November, 1938, Wayne Thomas presented a new picture of immense reserves of phosphate rock in Florida—reserves measured in billions of tons instead of millions, as heretofore, rivaling and perhaps exceeding the immense reserves already known to exist in the western states. On the basis of 55 per cent. b.p.l. or better, he estimates potential supplies of land pebble and river pebble at 3,145 million tons and reserves of hard rock at 3,000 million tons. Reserves of low-grade phosphatic marls also may be included as they are now capable of being raised by benefication to adequate commercial grades. Finally, there are the reserves in the underlying phosphatic bedrock (the Hawthorne formation) of the present fields, which are said to be too enormous to be estimated.

Pebble phosphate of the Bone Valley area in Polk and Hillsborough Counties of over 1,000 tons per acre have been found on about 700,000 acres. Many parts of the area have a pebble concentration ranging from 10,000 to 36,000 tons per acre. The entire area appears to have an average of 4,000 tons per acre, which gives a total of 2,800 million tons of 55 per cent. b.p.l. or better, of which 800 million tons average 66 per cent. b.p.l. or better. Just the companies now operating in this area have reserves of 477,311,735 tons of rock over 66 per cent. b.p.l. with additional lower-grade material. Only 2 per cent. of the Bone Valley area is said to have been mined in the 49 years since land-pebble mining began. Land-pebble deposits ranging from 55 to 70 per cent. b.p.l. and from 50 to 100 million tons each are said to occur in Hamilton, Clay, Bradford, and Lake Counties. River-pebble deposits, formerly worked but abandoned because of the competition of the high-grade land-pebble deposits, are assumed to total 50 million tons. Hard-rock deposits are in 15 counties. Total workable area, carrying 5,000 to 20,000 tons per acre, covers an estimated 48,000 acres, which, at only 5,000 tons an acre, accounts for 2,400 million tons. Approximately one-third of this reserve is soft phosphate running 55 per cent. b.p.l.

THE CRUSHED-STONE INDUSTRY IN 1938

The sand classifiers which adjoin the screening bridge at the T. V. A. Hiwassee Dam plant.

THE crushed-stone industry apparently has gone through the year with little loss of production and the present general business improvement should carry 1939 output to the highest level of recent years. Early in the summer of 1938 a survey of the existing and prospective demand was made. A total of 98 representative crushed-stone producers in 21 states reported an average drop of only 9 per cent. in output compared to the same period in 1937. A similar drop for the year was predicted but the current "boomlet" had not yet begun at that time. Recent contacts with these reporting companies and many others indicate that the crushed-stone industry is entering the new year on an upward swing.

Judging from the buying activity of the industry during the year, producers are preparing their plants for a larger output. No extremely large new commercial plants were built, the largest having a capacity of 200 tons per hr. The current trend toward the use of smaller rock in concrete mixtures and for other purposes was responsible for the installation of additional crushers and other equipment in many plants. The growing demand for agricultural limestone was responsible for many of the new plants built and for much of the new equipment installed.

One of the most important new plants built was that of the Tennessee Valley Authority at Hiwassee Dam in southwestern North Carolina. The rock at this quarry is high in silica and presented difficult problems which were successfully solved. Hammer-mills are being used to reduce this highly-abrasive material and dust-collecting systems have eliminated any danger of silicosis. A complete description of this operation was published in the September, 1938 issue of PIT AND QUARRY.

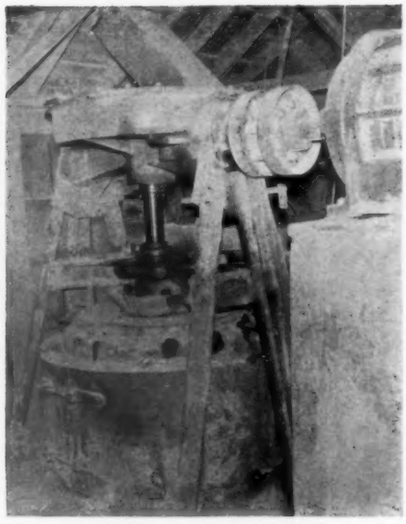
The Allis-Chalmers 42-in. gyratory primary crusher has a hood connected to a Schneible dust-collector. A belt-conveyor discharges to a storage pile, from which a Jeffrey-Traylor vibrating feeder and a belt-conveyor discharge to a storage pile, from which a Jeffrey-Traylor vibrating feeder and a belt-conveyor supply the screening plant. Eight vibrating screens of various makes are used and the oversize material is reduced in a Symons cone crusher. Two Allis-Chalmers hammer-mills, two Pennsylvania hammer-mills, a Nordberg Wood Auto-Vortex classifier and a Dorr bowl classifier are used in making stone sand. Another Schneible collector is connected to the secondary crusher, hammer-mills, screens, etc.

The John Redman Sand & Gravel Co., a gravel producer of long standing, in July, 1938 built a crushed-stone plant to meet the demand for aggregates. This plant is only ¾ mi. from

A view of the screening bridge, sand classifier and radial stacker at the new plant of the T. V. A. at Hiwassee Dam.

The Weston & Brooker Co. stone-sand plant with hopper and stockpiles.

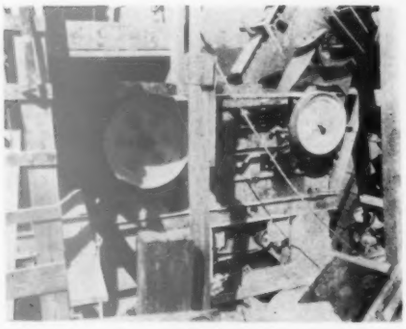
The new limestone-pulverizing plant of the New Castle Lime & Stone Co. with tunnel conveyor from stock-pile.



One of the two pulverizers in the plant of the New Castle Lime & Stone Co.

Dust-collector installation at the crusher building of the Hiwassee Dam plant.

A view of the new crushed-stone plant of the John Redman Sand & Gravel Co. showing how stone is chuted to hillside stockpiles.



A close-up of the roll and jaw crushers at the Ehrler plant.

The new crushed-stone ballast plant of Walter J. Ehrler with chute from quarry to crushers at left.

The new rail-mounted plant of the Miami Oolite Rock Co., with conveyors for loading cars and trucks.

the gravel plant operated by the company at Penfield, N. Y. Truck haulage is used in the quarry. A belt-conveyor feeds from the primary crusher to a Seco (Screen Equipment Co.) vibrating screen. The oversize goes to any one or more of four gyratory reduction crushers. The product of these crushers and the material through the screen are fed by a belt-conveyor to another Seco sizing screen. The oversize is returned to the secondary crushers by a belt-conveyor. The material passing through this screen goes to a third Seco screen for final sizing. Storage piles are on a hillside below the plant. Cranes transfer the material to bins, from which trucks are loaded.

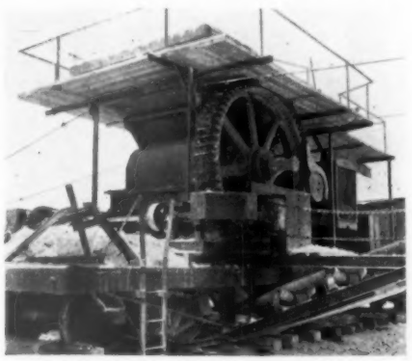
A new plant for the production of railroad ballast was put in operation by Walter J. Ehrler near Malvern, Ark., a few months ago. The stone is loaded by a shovel into cars, from which it is discharged through a chute. An apron feeder discharges the stone into a jaw crusher, from which it is elevated to a Simplicity double-deck screen. The coarse material is discharged into a double-roll crusher from which it is returned to the screen. The Universal Crusher Co. supplied the equipment for this plant. All the equipment is driven by a 125-hp. Caterpillar Diesel engine.

The Big Rock Stone & Material Co., Little Rock, Ark., built a new steel and reinforced-concrete crushed-stone plant with a capacity of 200 tons per hr. The Greenville Crushed Stone Co. built a small new plant at Greenville, Ky.

The Blair Limestone Co., Blairton, W. Va., which a year ago completed a modern new crushing plant, in 1938 built a new washing plant. A new plant was also built by the Hein Bros. Basalt Rock Co. near Redding, Cal.

New plants were also built in 1938 by the Sunnyside Granite Co., Richmond, Va.; the C. & R. Engineering Co., Warrensburg, Mo.; the Western Lime Quarries, Baker, Ore.; and the Basic Limestone Products Co., Ltd., Lyndon Switch, Col. Wm. Ryan & Sons, Norwich, Conn., built a new plant and bought a 1½-cu. yd. Koehring gasoline shovel.

One of the best of the many new limestone-pulverizing plants of the year



A closeup of the Miami Oolite Co. plant showing the roll crusher and engine.

was that of the New Castle Lime & Stone Co. at Edenburg, Pa. This company has been a manufacturer of this material since 1921 and the new plant is the result of its wide experience in this field. No effort or expense was spared to make this an efficient and economical plant. A description of it was published in the September, 1938 issue of PIT AND QUARRY.

Stone for this plant is reclaimed by a tunnel conveyor from the waste stockpiles of the Union Limestone Co. A 45-ft. rotary drier precedes a Seco (Screen Equipment Co.) vibrating screen, which removes an occasional oversize stone. The material passing through the screen drops into a 175-ton Heltzel steel tank. Table-feeders supply the two Bradley Junior Hercules mills and are automatically governed by the load on the mill motors. An arrangement of a Heltzel bin and batcher is used for loading trucks. Most of the product is used for agricultural limestone and fertilizer filler.

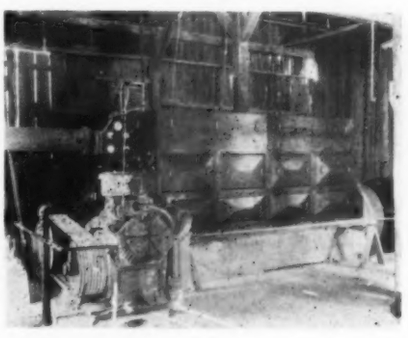
The continued demand for agricultural limestone was also responsible for a continued expansion of productive facilities. Bradley Junior Hercules mills were installed by the National Lime & Stone Co., at Spore, O., and by the Ohio Blue Limestone Co. at Marion, O. The latter also installed a Robins Vibrex screen. The Franklin Limestone Co., Nashville, Tenn., installed a Williams hammer-mill.

Quarries were opened for this purpose by the E. W. Young Stone Co., Augusta, Kan.; Joe Winke, Bonaparte, Ia.; Felix Dunn, Romana, Ind.; Baker & Bryan, Red Wing, Minn.; Okolona Lime Plant, Okolona, Miss.

The Central Rock Co., Lexington, Ky., installed a Telsmith jaw crusher, a Williams hammer-mill and other equipment for the production of agricultural limestone. The Conklin Limestone Co., Canaan, Conn., built a new plant with a Day pulverizer.

A special rail-mounted portable crushing plant designed for the type of lime rock found in southern Florida was built by the McLanahan & Stone Corp. for the Miami Oölite Rock Co. of Coral Gables, Fla. A 1½-cu. yd. drag-line feeds the rock into a hopper over the McLanahan & Stone single-roll crusher which has lugs and special teeth. The product, ranging from dust to stone 3 in. in size, can be discharged on a boom belt-conveyor on one side for truck-loading or to a similar conveyor on the other side for car loading. A 150-hp. Waukesha Hesselman oil engine drives the crusher and conveyors. This plant has loaded a 50-ton car in 11 min.

At its Cayce, S. C., plant, the Weston & Brooker Co. for years has had an excess of screenings, which contain no silt but are a little too coarse for use as concrete sand. Some of this material has been sold for bituminous mixtures, but this demand has been limited. It



The 360-hp. Diesel engine which operates the plant of the Charles Stone Co.

was then found that mixing these screenings with local bank sand made an ideal concrete sand. A plant for mixing and loading this product was built early in 1938.

Trucks haul in the bank sand and dump it in stock-piles. A stiff-leg derrick used for stock-piling products of the crushed-stone plant rehandles the sand and screenings into a 2-compartment wooden bin of 175-ton capacity. Special roll-feeders driven from the same motor discharge these materials on an 18-in. by 120-ft. Link-Belt belt-conveyor. Sliding lever-operated gates control the proportions, which are found to be best at 60 per cent. sand and 40 per cent. screenings. A pug-mill mixer discharges the concrete-sand mixture direct into cars through a chute or into a bin for truck-loading.

This sand was used in the widening of 17 mi. of highway and some relocation work. It was shipped by railway to the job and unloaded by a crane into a batcher bin. A local ready-mixed-concrete producer had the contract for placing the concrete. This was done with truck-mixers. Tests of the concrete showed that satisfactory strengths were obtained.

An interesting plant for the production of terrazzo chips was built by the Inkley Marble Quarries near Ste. Genevieve, Mo. Incidental products are chicken grit and dust, and crushed stone can be produced if desired. This plant uses waste stone from the company's dimension-marble quarry. Crushing is done by an American ring-crusher from which it is elevated to a Nordberg-Symons screen. The oversize is returned to the crusher and the products drop into bins. A belt-conveyor reclaims the material and feeds it to the sack-loading and storage building. This plant was completely described in the December, 1938 issue of PIT AND QUARRY.

The new plant of the Weston & Brooker Co. at Cayce, S. C., which mixes stone and river sands.

A modern crushing-and-screening plant for the production of terrazzo chips was built by the American Marble Co., Ltd., Toronto, Ont. It has a daily capacity of 50 tons.

The Thompson Weinman Co., Tate, Ga., built a new crushing plant for marble and sericite. An Allis-Chalmers crusher and a Raymond mill were installed.

The Marble Cliff Quarries Co., Marble Cliff, O., completed a $40,000 remodeling program. An F. M. Welch roll-crusher, Robins Vibrex and Gyrex screens, feeders, and a crane were purchased.

The Hopkinsville Stone Co. built a new plant at Russellville, Ky. Two Jeffrey pulverizers, a Brooks Loadlugger haulage system, and a Fairbanks truck scale were installed. The Inter-City Material Co., Kansas City, Mo., bought a Diesel engine. The city of Cullman, Ala., installed a Day pulverizer. The Burkholder Quarry Co., Ephrata, Pa., installed a hammer-mill.

The Hoosac Valley Lime Co., Adams, Mass., built a new ground limestone plant. The Broward Quarries, Miami, Fla., added a sand-drag, screens, conveyors, etc.

Floods, fires and hurricanes caused considerable damage to nonmetallic-minerals plants in 1938. The West Roxbury Trap Rock Co., West Roxbury, Mass., spent $15,000 for new equipment following the hurricane. The Morris Limestone Products Co., Central, Ill., is rebuilding its crushing and screening plant which was destroyed by fire. A Traylor TY crusher had been installed earlier in the year.

The trend toward flexible types of hauling equipment continued. Brooks Loadluggers were installed by the Kentucky Stone Co., Louisville, Ky.; the Bussen Quarries, Jefferson Barracks, Mo.; Robert Quinn, Danville, Ky.; and the Buchanan Stone Co., Clarksville, Tenn. The Servtex Materials Co., New Braunfels, Tex., added a truck with an Easton Phoenix hydraulic dump body.

The Raleigh Granite Co. installed its second fleet of Easton semi-trailers at its Woodleaf, N. C., quarry. Several new 10-ton Mack trucks were added by the Palmetto Quarries Co., Columbia, S. C. Several quarry trucks were also pur-

The new terrazzo plant of the Inkley Marble Quarries which uses cuttings and waste from marble quarry at left.

chased by the Gouverneur Limestone Co., Gouverneur, N. Y.

The Graystone Quarries, Inc., Johnstown, Pa., bought three Koehring Trail-Dump units to haul stone from its quarry to the plant. These tractor-trailers are mounted on oversize pneumatic tires. An Osgood shovel, crusher and screens were also installed.

C. W. Blakeslee & Sons, New Haven, Conn., installed a Robins Gyrex screen. A Robins Vibrex screen was added by the New Haven Trap Rock Corp., Plainville, Conn. A Seco (Screen Equipment Co.) 3-deck screen was installed by the Virginian Limestone Corp., Ripplemead, Va. The Golden Dolomite Co., Crystal River, Fla., installed a Maddox vibrating screen.

Robins Vibrex screens were installed by Dolese & Shepard, Chicago, Ill., and the Bethlehem Steel Co., Bridgeport, Pa. Robins Gyrex screens were installed by C. W. Blakeslee & Sons, New Haven, Conn.; the Pennington Trap Rock Co., Pennington, N. J.; the Plattsburgh Stone Products Co., Plattsburgh, N. Y.; and the Centropolis Crusher Co., Kansas City, Mo. The New York Trap Rock Corp., New York, N. Y., installed both types of screens.

The Charles Stone Co., Cypress, Ill., early in 1938 installed a 360-hp. National Superior Diesel engine to operate its plant. This engine has reduced power costs considerably and operates a shovel, four crushers, elevators, conveyors and screens.

A compressor is driven direct from the engine, which also drives a generator supplying current for the shovel and two crushers. The remainder of the equipment is driven through lineshafts and belts.

The Columbia Quarry Co., St. Louis, Mo., in 1938 bought its fifth National Superior Diesel engine in two years. A new plant was built at Grafton, Ill., in which three Caterpillar Diesel engines and an American ring crusher were installed. Several American pulverizers were also installed at the company's plant at Valmeyer. Truck-trailers with Easton bodies were put into operation at the company's quarry, located at Krause, Ill.

The Genesee Stone Products Co., Batavia, N. Y., bought a 675-hp. Buckeye Diesel engine. A 102-hp. Allis-Chalmers engine was installed by the Gingell Quarries, Gettysburg, Pa. The Charlottesville Stone Co., Charlottesville, Pa., installed a new Allis-Chalmers gyratory crusher and four Caterpillar Diesel engines. Canadian Quarries, Ltd., Montreal, Que., installed a 225-hp. Diesel engine.

The Stiles Quarry, Greenwich, N. Y., and the Eastside Building Materials Co., Roscoe, Cal., added Kennedy-Van Saun gyratory crushers. A Pioneer crusher was installed by the L. Romano Engineering Corp., Riverton, Wash. Crushers were also installed by the Young & Wiley Stone Co., Towanda, Kan., and by the Roling Concrete Co., Ada, Okla.

American pulverizers were installed by the Willingham-Little Stone Co., Whitestone, Ga.; R. E. Okerson's Quarry, Cave-In-Rock, Ill.; the Ste. Genevieve Lime & Stone Co., Ste. Genevieve, Mo.; and the Stotz Quarry, Waterloo, Ill. Symons cone crushers were installed by the Pekin Stone Products Corp., Lockport, N. Y.; the John W. Karch Stone Co.; Geneva, Ind.; and the West Nyack Trap Rock Co., West Nyack, N. Y.

The Sturgeon Bay Co., Sturgeon Bay, Wis., installed a Symons cone crusher and a conveyor tunnel to reclaim stone from stock-piles. An Allis-Chalmers crusher and a Barber-Greene conveyor were added by the Manegold Stone Co., Milwaukee, Wis. A Robins gyrex screen and a bucket-elevator were added by the Thomasville Stone & Lime Co., Thomasville, Pa. A Telsmith vibrating screen, a belt-conveyor and a crusher were installed by the Bonnie Brook Quarries, Carlisle, Pa. The Southwest Stone Co., Dallas, Tex., bought Allis-Chalmers vibrating screens to replace four revolving screens.

The Halquist Lannon Stone Co., Sussex, Wis., installed a Lippman pulverizer. D. A. Davis, Crawfordsville, Ind., installed a Williams hammer-mill. W. W. Boxley & Co., Roanoke, Va., added two vibrating screens and a 10-ft. sand-cone.

The Caldwell Stone Co., Danville, Ky., installed a Traylor jaw crusher, an Ingersoll-Rand air-compressor and Jackhamer, four Ford dump trucks, and other equipment. The Connellsville Bluestone Co., Connellsville, Pa., added

(Continued on page 97)

The ring crusher and feeder at the new terrazzo plant of the Inkley Marble Quarries near Ste. Genevieve, Mo.

Stone from the quarry is hauled to the plant of Graystone Quarries, Inc., by Koehring Trail-Dumps, tractor-trailer units of large capacity mounted on oversize pneumatic tires.

A Survey of Labor-Relations Codes in the Cement Industry

A SURVEY recently conducted by the United States Department of Labor discloses some interesting conditions in the field of industrial relations in the cement industry. Forty-seven separate labor agreements with local unions directly chartered by the A. F. of L. were carefully studied and analyzed, with the object of discovering any tendencies that may exist in the field of labor relationships.

The operations of the A. F. of L. in the cement industry date back to the period following the enactment of the N. I. R. A. Delegates from 27 cement unions held a conference in August, 1936, in St. Louis, and formed the National Council of United Cement Workers. The number of unions affiliated with the National Council had increased to 58 by August of last year, while the total number of Federal unions in the cement industry was 66.

Life of Agreements.—All the 47 agreements contained provisions for automatic renewal from year to year, and are based on yearly periods. Notice is required in all cases, the time ranging from 30 to 60 days.

Union Status.—In 11 of the 47 agreements membership in the union is a condition of continued employment, old employees usually being given 15 or 30 days in which to apply for union membership, while new employees are given a similar period from the date of their employment. In one case there is provision that no seniority rights shall accrue in the absence of union membership. The union is designated in five agreements as the sole bargaining agency for all the employees of a company, while in 30 other agreements the union is empowered to act for its members only. Thirteen contracts provide for the use of the check-off system in which the employer deducts the union dues from the employees' pay, provided written authority is given by the employee. Discrimination against unions on the part of the employer is forbidden in 17 agreements, and this is usually accompanied by the stipulation that the union will conduct no activity on company property or on company time. In more than half the agreements the union is given the right to use company bulletin boards for official notices.

In one agreement it is provided that a contract will become null and void in the event that the regular union severs its affiliation with the A. F. of L. Another contract provides that if the company feels that the union does not represent a majority of the company's employees, then the union, at the company's request, shall submit the question to the National Labor Relations Board.

One contract contains a provision that the union shall not make any request of the company unless such action has first been approved by a ballot vote of 66⅔ per cent. of the members present at the meeting when the request is made, and subsequently approved by election by 66⅔ per cent. of the union membership.

Disputes.—Practically all the contracts provide for meetings between the company and the union. Fourteen provide that these meetings must be held at regular intervals, while one agreement grants union members full pay for any time lost through attending them.

Many of the contracts provide that outside representatives not employed by competitive companies may represent the employees before officials of the company. Thirty-five of the agreements provide for arbitration and 14 of these that the arbitration decision shall be binding on both the union and the employer. A common arrangement sets up a committee of two representatives for the union and two for the employer, these four electing the fifth, who serves as chairman. Practically all these agreements provide that there must be no strike, lock-out, or stoppage of work during negotiations and arbitration.

Strikes and Lock-outs.—All but 13 of the agreements contain provisions outlawing strikes and lock-outs while negotiations are proceeding, and ten of the "no-strike" clauses outlaw all strikes and lock-outs during the life of the agreement, any violation being a cause for its termination.

Seniority.—All but one of the 47 agreements provide for seniority. In one case a distinction is provided in the statement that "seniority in each operation shall be separate and apart." In most of the agreements the employer agrees to follow departmental seniority in lay-offs, promotions and rehiring, but the requirements of the job, individual skill, efficient service, physical fitness, and, in some cases, family status will also be considered. Seniority determines when these other qualifications are nearly equal.

In most of the agreements the employer agrees to furnish the union with a list of employees according to their seniority status. Any deviations from the application of this ranking become subject to negotiations.

Practically all the agreements mention the continuance of seniority status through lay-off periods and absence due to illness. Time off for union officials to attend union meetings without loss of status is provided in 26 agreements, the allowable period running from two weeks to "any reasonable length of time" in some others.

Notices of vacancies, with a time limit during which eligible employees may apply, is provided for in 26 contracts.

The temporary period which is necessary before any employee can establish seniority rights runs from one month in a few agreements to one year in more than a dozen.

One contract provides that any employee who wishes to do so may sign a waiver of his seniority rights and file it with the company.

Hiring and Firing.—Either explicitly or implicitly all the contracts reserve to the employer the right of hiring employees and in no case does the union undertake to supply employees to fill new positions.

In 11 agreements provision with respect to discharge is made by requiring the company to show reasonable cause for summary dismissal, if the union or employee involved requests it. Five contracts provide for an investigation of the dismissal, one calling for a union-management committee, and one for an investigation by the management alone. In these agreements provision is made for the reinstatement of the discharged employee, if his dismissal is found to be unjust.

Hours of Labor.—The agreements usually provide for the 8-hr. day and the 40-hr. week, with a 48-hr. week in three contracts, and a 6-hr. day and 36-hr. week in six contracts. In some of the latter the operation of overtime provisions is suspended until the hours exceed 8 per day or 40 per week. Those agreements setting up the 6-hr. shift also provide that the union will reöpen negotiations on the subject of hours of labor whenever the increase of the volume of business warrants a return to 8 hr. per day.

The time-and-a-half rate for overtime compensation appears in all the contracts, except that in two agreements maintenance men and relief operators may be employed 4 hr. longer each week without overtime pay, and two of the contracts provide double pay for excessive overtime, in one case the excess being defined as time longer than 12 hr. per day, 40 hr. per week, or 6 days per week, and in the other as 12 hr. per day, 52 hr. per week, or 6½ days per week.

Overtime work on standard, specified holidays is paid at the time-and-a-half

rate in practically all these agreements. Some of them do not include any holiday rate, and two provide for double time.

Thirty-one agreements provide that there must be no lay-offs to equalize overtime, and provide that overtime work is to be divided, as far as possible, equally among the men in any department, this requirement being contained in more than half the contracts. In each agreement it is stipulated that the company's right to a 7-day continuous operation is not in any way affected by its time and overtime provisions.

Wages.—Most of the 47 agreements do not specify definite wages, providing merely that existing wage scales shall remain unchanged during the life of the agreement, but that the company may increase wages in any class or to any individual in any class without necessitating a change in the rate of any other individual or class.

Of the 8 contracts specifying definite wage rates, one provides for a minimum, plant-wide hourly wage of 30 c., while in the other 7 a 58-c. per hr. rate is the lowest mentioned. In the wage-rate schedules the range extends from 58 to 70 c. for common laborers, approximates 75 c. for machine operators and semi-skilled trades, and reaches $1.05 for skilled crafts, such as machinists and powder men.

In several agreements it is provided that wage negotiations must be reopened, if legislation limiting the number of hours worked to fewer than those named in the agreement should be passed.

Two contracts provide compensation for time spent in traveling to and from the factory for emergency work. In another contract it is provided that any employee required to stay on the night shift for more than 8 weeks continuously shall receive additional compensation at 5 c. an hr.

Employees who are called to work but not given employment for a full shift are provided for in every agreement, usually granting the employee 3 hr. pay if he is furnished with less than 3 hr. work. In a few cases the minimum time allowed is 2 hr., while in a dozen other cases it is 4 hr. Several agreements specify that a regular employee should be considered ordered to report for work unless definite notice is given to the contrary. Six agreements provide 12 hr. notice and two others require notice at the end of the preceding shift.

The only piece-rate workers in the cement industry under these agreements are employed in the packing-houses. In many agreements a minimum hourly rate is provided as an alternative, this rate approximating the hourly rate for common labor in other parts of the plant.

Slack Work.—More than one-third of the 47 agreements contain provisions that during regular seasons all the available work shall, as far as practical, be divided equally among all the employees in their respective departments. Fifteen agreements require one week's notice of an impending shut-down, while two others provide a two-week notice.

Vacations.—Vacations with pay are provided for in nearly three-fourths of the contracts. A typical arrangement is one week's vacation with pay for all employees having served more than one year; in four agreements the vacation credit accrues at the rate of one-half day for each month employed during the preceding year, this credit not to exceed 40 hr. (one week) each year. In one agreement an additional week's vacation with pay is granted to all employees who have served more than five years. In another agreement vacations are to be granted only after the company earns a profit and a dividend is paid to the stockholders. Usually the employee is allowed to fix the time of his vacation, but many of the agreements stipulate that the employer may consider the efficient operation of the plant in granting such requests.

Contract Work.—In nearly three-fourths of the agreements the company agrees to continue to perform all the work customarily performed by it in its own plant with its own employees, unless the work can be done more economically or more expeditiously otherwise. In the latter case the contractors are required to conform to the terms of the agreement.

Safety.—In most of the contracts there are provisions for medical service, safety, and welfare at the company's expense. The installation of safety devices required by law, the provision of heat, light and hot water in the wash-houses, keeping sanitary fixtures in good condition, and providing a supply of good drinking water about the plant are typical provisions. In five of the agreements the union takes over the duties of the plant safety committee.

Other Provisions.—The right to employ handicapped workers, whose earning capacity is limited, at a wage rate below that set for regular employees is provided in three contracts.

The employer can not employ anyone who is under 18 years of age in four contracts.

New employees must be American citizens or foreign-born who have taken out their first citizenship papers in one agreement. Only union labor can be employed on the installations of new machinery or the building of a new plant, according to one agreement.

In contracts which have special provisions for packing-house employees it is stipulated that contract workers in the pack-house will stow their own cars up to eight sacks high, the company furnishing additional help for higher stacking and to clean and drop all cars.

One agreement provides that either party shall have the right to have the contract specifically enforced, and to prevent its violation by injunction.

In three agreements it is provided that no gratuity shall be given to or accepted from any supervisor or company representative with the intent of gaining favor or obligating any member of the union.

Stone in 1938 *(from page 95)*

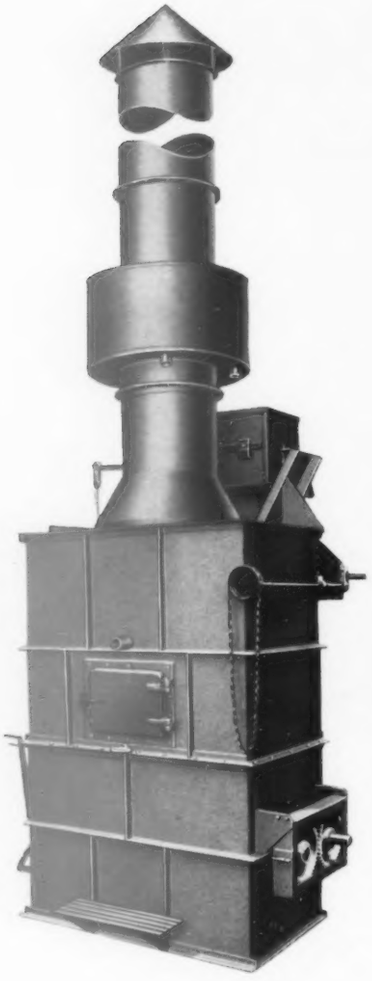
a Kennedy-Van Saun crusher and an Ingersoll-Rand compressor. Cocke & Braden, Amarillo, Tex., bought two Caterpillar Diesel power units, a Williams Junior hammer-mill, a vibrating screen, and belt-conveyors.

Wm. J. Barry, Roslindale, Mass., bought a Barber-Greene loader and plans to install a new reduction crusher. A Barber-Greene loader was installed by the Harris Granite Quarries Co., Salisbury, N. C. J. H. Bell, Shingle, Cal., bought a storage-battery locomotive. The Greensburg Stone Co., Greensburg, Ind., installed a Traylor TY reduction crusher. The McKinley & Brugler Stone Co., Rushsylvania, O., installed a New Holland roll-crusher and a bucket-elevator.

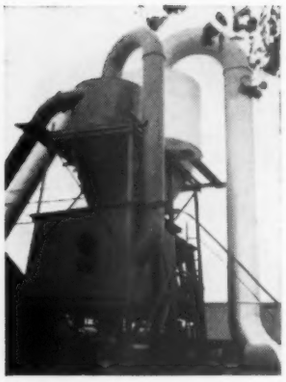
An interesting new plant was built at Dailey, W. Va., by the Tygart Valley Assn. of Elkins, W. Va., for the production of crushed stone and lime dust. This association was formed by local farmers and other interested individuals primarily to supply agricultural lime to farmers in the Tygart Valley. The Diamond Iron Works, Inc., designed this plant and furnished all the equipment. The Diamond primary jaw crusher feeds a conveyor to a triple-deck vibrating screen. A roller-bearing roll-crusher reduces oversize stone and a second triple-deck screen is used for further sizing. A hammer-mill can be fed from the storage bins to make the lime dust.

The A. T. & C. Stone Co., Orleans, Ind., installed a vibrating screen and a Day pulverizer. The Bassett Products Co., Monticello, Ky., added a roll-crusher. Vibrating screens were installed by the Monon Crushed Stone Co., Lafayette, Ind. S. W. Barrick & Sons, Woodsboro, Md., installed a pulverizer and a portable conveyor. A crusher and a Robins Vibrex screen were installed by C. C. Beam, Inc., Melvin, O. Macklin & Macklin, Steward, Ill., bought a new crane.

New Machinery in 1938



The Weber Jr. lime hydrator was designed essentially for handling 2 tons of raw lime per hour. It is of the batch type and for small producers insures control of operation and uniform batches of hydrate. Thorough mix and agitation with equalized water distribution insures a constant product. Arnold & Weigel Inc., Woodville, O.



Typical installation of the new line of Corona dust collectors recently marketed by the Clark Dust Control Co., Chicago, Ill. The equipment is entirely of metal, devoid of mechanism, efficient and inexpensive.

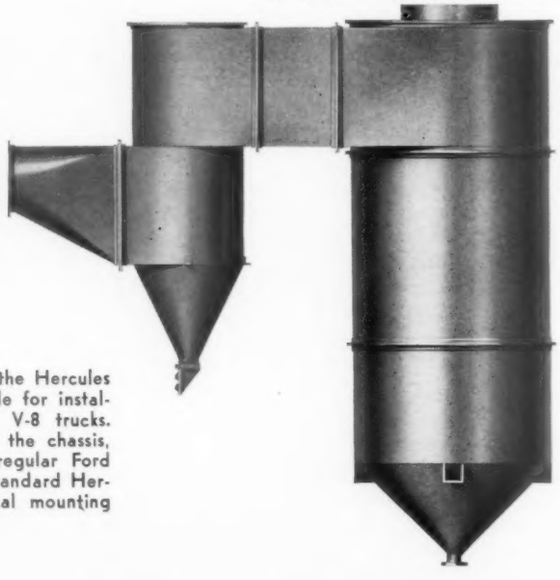
A 1939 line of Ford V-8 trucks equipped with hydraulic brakes and comprising the widest selection of capacities, gear reduction ratios and power it has ever offered the transportation field, has been announced by the Ford Motor Co. Three V-8 engines are available for 1939. Heading the list is the new 95-hp. engine with piston displacement of 239 cu. in. The 85- and 60-hp. engines have been improved this year.

The Sturtevant Hydro-Clone (right) is designed to suppress fine "nuisance" dust without the use of cloth screens, filter screens or any moving part. The bulk of the dust is collected dry, the air receiving its final cleaning by water. It is said to be freeze-proof.

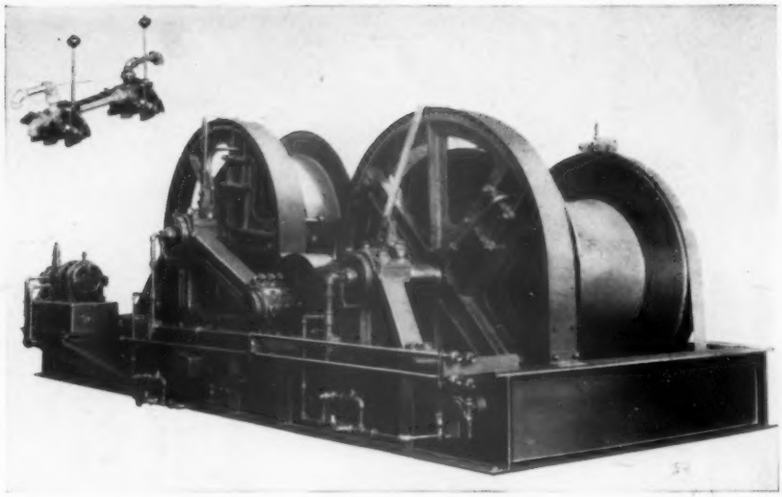
LEFT—Diesel engines, built by the Hercules Motors Corp., are now available for installation in all models of Ford V-8 trucks. Without any major changes in the chassis, frame or dash assembly, the regular Ford engine can be replaced by a standard Hercules Diesel engine of identical mounting dimensions.

Simple in design and rugged in construction the Model 375 American Gopher shovel-crane-dragline is speedy, versatile and handles like an automobile. Correct distribution of weight insures perfect stability. The necessary working weight is in the machinery itself instead of being hung on the rear as dead counterweight.

New speed-changer unit utilizes the well-known Allis-Chalmers principle of multi-groove "vari-pitch" sheaves. The totally-inclosed unit, designed with double-shaft extensions, provides wide flexibility. Either manual or remote control may be had at the option of the user.



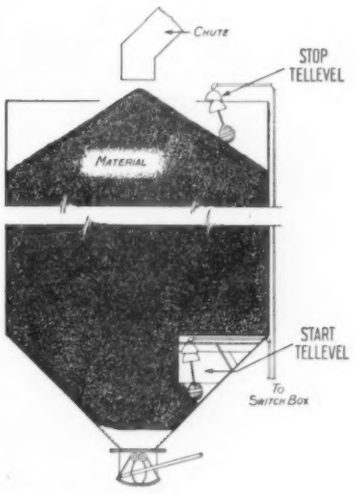
New Machinery in 1938



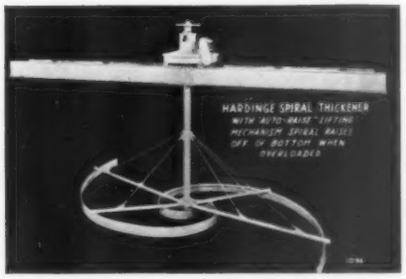
A system of oil hydraulic control has been developed by Sauerman Bros., Inc., for both its scraper and cableway hoists as an alternative to the standard air, electric, or hand-lever control. It is claimed that the oil hydraulic control gives the operator more sensitive control of clutches and brakes.

Besides making a number of improvements in its line of excavating machinery, the Bucyrus-Erie Co., Milwaukee, Wis., introduced the above oil filter which reclaims used lubricants at small cost. Semi-automatic, the machine is electrically operated.

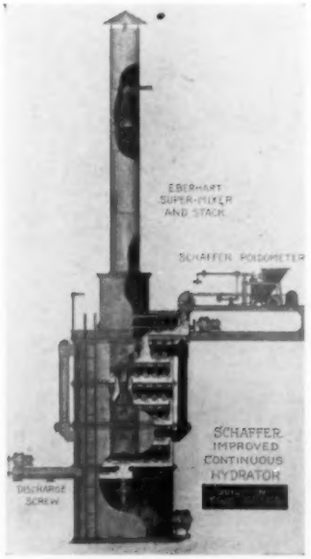
The Speed Dumper manufactured by Speed Dump, Inc., New York, N. Y., is a mechanical-hoist-driven detachable steel bucket truck unit for hand-loading operations. The buckets may be nested and transported five at a time. They may be lowered into an excavation to any required depth, controlled only by the amount of cable used on the drum. Two-way power control insures positive and safe lifting and lowering. Light weight is obtained by a rigid type of construction.



The Tellevel is a sensitive, inexpensive device containing three mercury switches which hang pendulum-like in a bin and automatically control the level of practically any material. Control is accomplished by starting or stopping the conveyors or elevators feeding the bin. (Stephens-Adamson Mfg. Co., Aurora, Ill.)

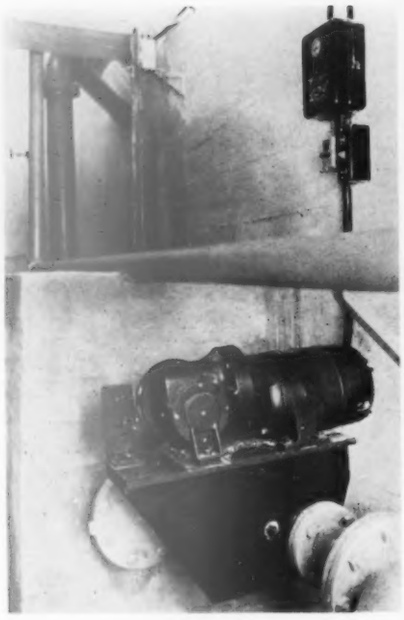


An outstanding 1938 achievement of the Hardinge Co., Inc., York, Pa., is the development of a new thickener mechanism known as the "Auto-Raise" whereby damage or breakage to thickener parts in the case of an overload in the tank is prevented. The entire mechanism is inclosed in a cast-iron housing resting on oil-submerged ball bearings.

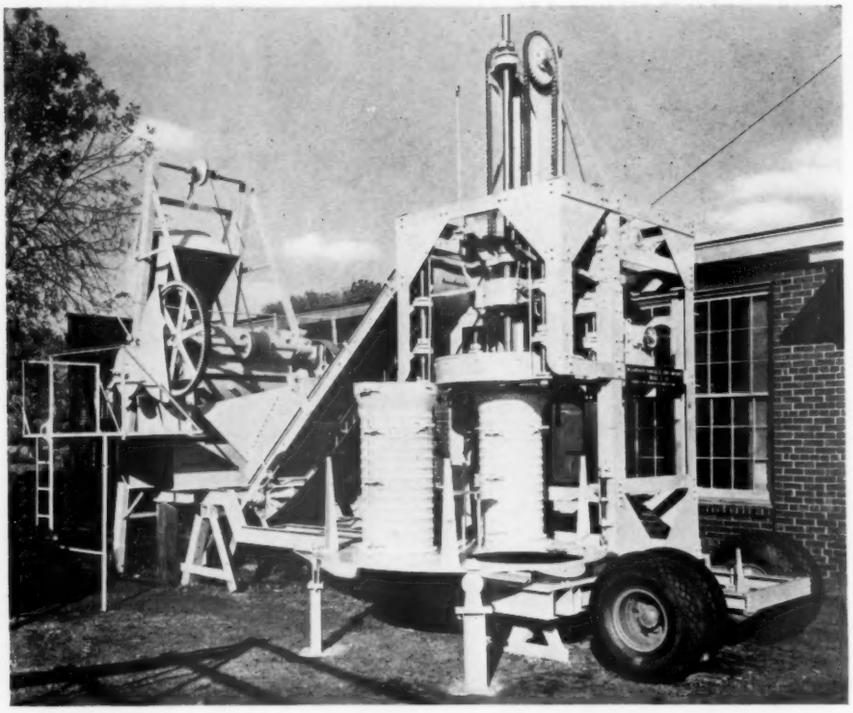


LEFT—Many new improvements and features have been added to the design and construction of the Schaffer continuous lime hydrator, taken over recently by L. H. Eberhart, Tiffin, O. Built in two sizes, 5 to 6 tons per hr. and 10 to 12 tons per hr.

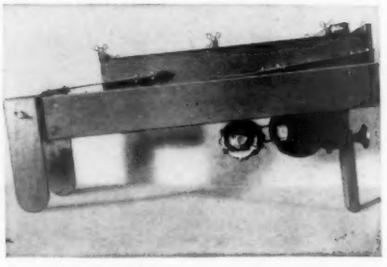
New Machinery in 1938



This slurry valve, operated by remote or automatic control, was one of the new products offered by the Fuller Co., Catasauqua, Pa. The company also improved its automatic remote-controlled unloader for bulk cement and introduced the Fuller inclined-grate cooler for cement clinker which combines abrupt air quenching, heat recuperation and final cooling. Another Fuller development of 1938 was a motion switch which automatically protects equipment due to the stoppage or failure of any unit in a series of operations tied together such as conveyors, elevators, feeders, etc.



The Concrete Pipe Machinery Co., Sioux City, Ia., makers of the Dual Packer-Head concrete-pipe machine, being used by 44 domestic and 25 foreign pipe manufacturers, recently announced a portable unit which is placed on a specially-designed trailer from which it can be both transported and operated. The company's objective is to take the transportation factor out of the cost of sewer pipe in sizes 4-in. to 36-in. Effective curing is accomplished by using tarpaulin inclosures that protect the pipe from sun and drying winds. They are sprayed at regular intervals for 48 hours. Pipe can be made from May 1 to November 30 in the northern states and the year around in the southern states. The portable plant is available only to users of the company's permanent equipment.

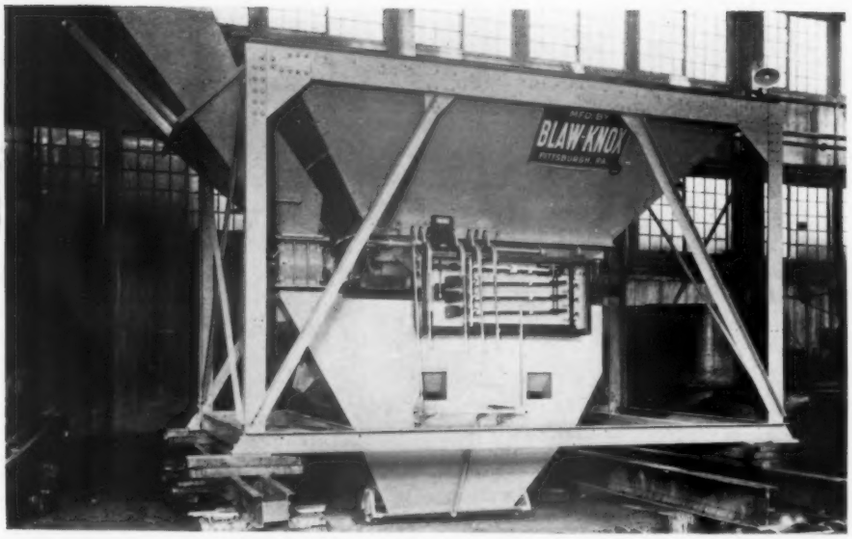


This small Vibroplane screen, having a nominal screening area of 12 in. by 24 in., was developed by the Ajax Flexible Coupling Co., Westfield, N. Y., especially for those operations where close separations of relatively small quantities of material are desired. The machine is regularly equipped with a dust-tight, easily-removable cover, and beaded inlet and outlet spouts allowing the use of dust-tight connections to and from the machine.

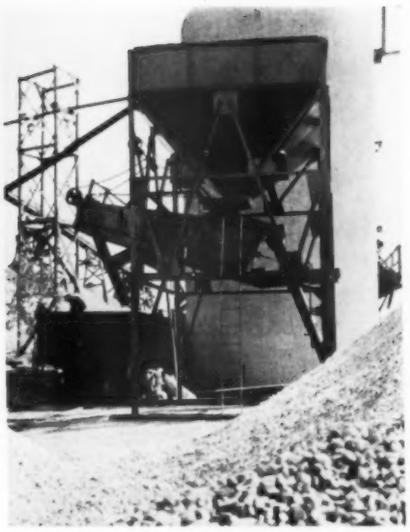
Bay City Shovels, Inc., Bay City, Mich., has announced the development of a new, heavy-duty, ¾-cu.yd. full-revolving, mobile truck-shovel-crane designated as Model 18. This machine with a swing speed of 5 r.p.m. is equipped with standard 30-ft. boom of heavy structural lattice-type construction. Special alloy-steel booms can be furnished with removable sections up to 80 ft. for high reach. Other features include a positive swing lock, securing the rotating base in any position of 360 deg. and patented electric dipper trip for shovel operation and self-locking boom hoist which raises and lowers boom under power. Shatter-proof safety glass is used for protection and safety of the operator.

The above spreader for agricultural lime is being marketed by the Smith Rotary Weigher Co., Springville, Ia. It consists of a cylindrical mixing drum mounted on a truck, a conical spinner spreading the material which is fed from the drum by a screw.

New Machinery in 1938



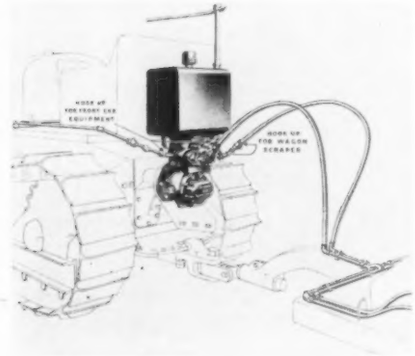
Among recent developments by the Blaw-Knox Co., Pittsburgh, Pa., is this 2-cu. yd. composite weighing batcher for cement and three classes of aggregates. One of the unique features of this proportioning unit is that all filling and discharge gates are mechanically interlocked. Only one filling gate can be opened at a given time and the batcher discharge gate can not be opened when any one of the four filling gates is open, or vice versa. The aggregate bin is a three-compartment unit of 120 tons capacity.



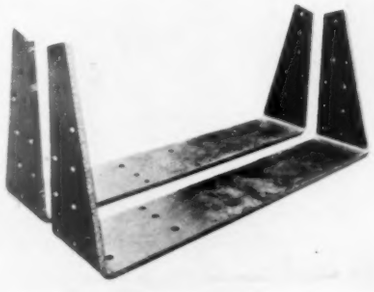
The Eagle Iron Wks. stock-pile re-washer is a combination of steel bin and screw washer of proper size to meet the capacity desired of the individual plant. This particular unit has a 30-cu. yd. bin and 24-in. diameter single-screw washer with shale-remover attachment. The shale remover would not, of course, be necessary to meet ordinary stock-pile re-washing requirements.

This Koehring stripping shovel is equipped with extra long and wide multiplanes and can be furnished with Diesel or gasoline power. The 30-ft. boom and 27-ft. dipper stick afford the long reach and high lift necessary for large stripping operations.

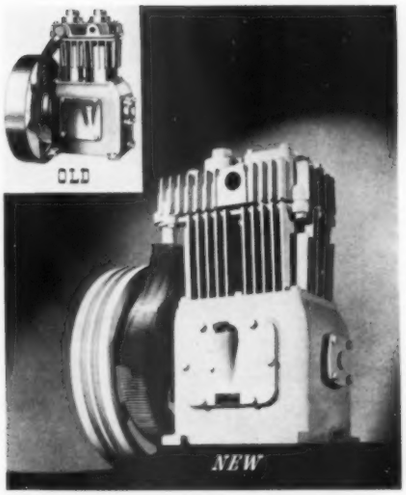
This 6-cu. yd. tractor scraper is another which has been added to the line of excavating and hauling units by the Austin-Western Road Machinery Co. of Aurora, Ill. Other popular sizes of this equipment are the models with 5 and 8 cu. yd. capacities.



The Be-Ge hydraulic pump unit made by the Continental Roll & Steel Fdry. Co., East Chicago, Ind., designed primarily for furnishing power to the hydraulic jacks that operate Continental wagon scrapers as well as other units that are hydraulically operated. Convenient extra outlets allow its use with tractor front-end equipment.

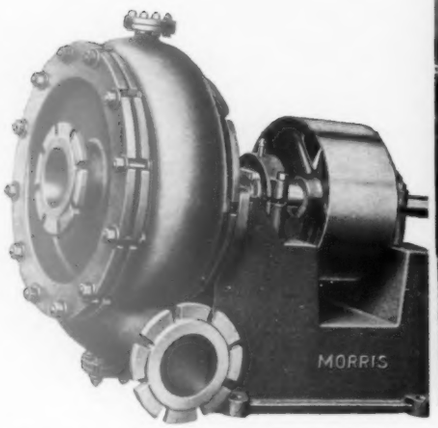


A pair of 5 ft. wide bucket lips, fabricated from 1-in. rolled manganese steel, formed to shape and provided with accurately-located rivet holes to conform to the holes in the bucket itself. They are assembled by the customer in the field. (Manganese Steel Forge Co., Philadelphia, Pa.)



The above pictures show design changes in the new air compressors of the Quincy Compressor Co., Quincy, Ill. These distinctive examples of modern machine design are the result of a conviction on the part of this manufacturer that air compressors deserve to be as good looking as they are efficient. Mechanical refinements include simplified construction and 12 per cent. greater radiation area on cylinders.

New Machinery in 1938

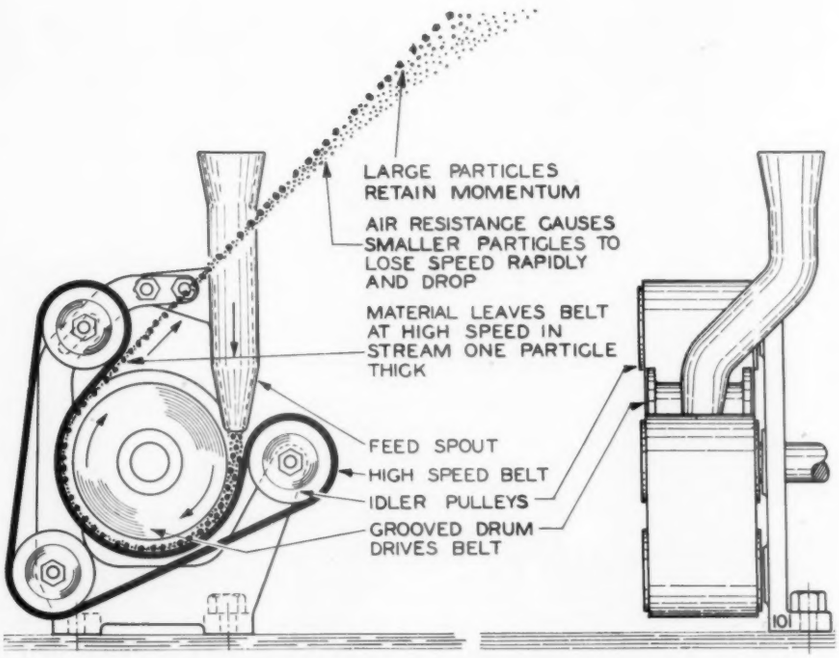


The new Morris Type K Sand Pump has only four parts subject to wear: the shell, suction disk, impeller and shaft. It has no hub disk, liner, suction-throat sealing ring, shaft sleeve, or other parts which would require adjustments to maintain initial efficiency or ultimate replacement due to wear. Its remarkably high efficiency is provided by the design of its waterways.

The "load forward" Dempster-Dumpster, now in production by Dempster Bros., Inc., of Knoxville, Tenn., is the newest development in detachable containers for truck hauling. By an exceedingly simple mechanism, the entire detachable container is carried forward on the truck chassis, thereby allowing larger capacities on smaller trucks. By an exclusive, patented dumping mechanism the contents are quickly discharged by levers operated from the cab by the truck driver. The entire load may be discharged at once or gradually, as desired. Chips may be spread evenly over a wide area, and the detachable container may be carried low to the ground, and be used as a spreader to more evenly distribute the dumped contents. The "load forward" model may be furnished in sizes ranging from 1 to 6 cu. yd.

Extremely low initial cost as well as low maintenance are claimed for the truck-mixer offered by the Lee Transit Mixer Corp., Indianapolis, Ind. There are only eight moving parts.

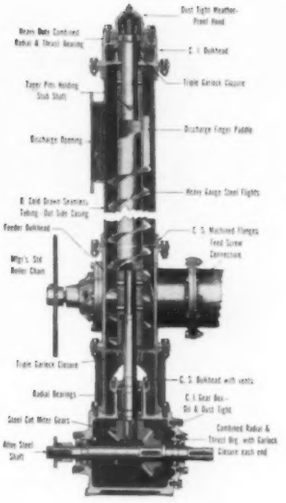
The Ty-Rock full-floating screen, designed for use in screening coarse and medium sizes of stone and ore, was a 1938 development of the W. S. Tyler Co., Cleveland, O.



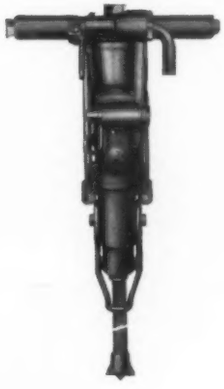
The Aurora classifier is a new development of the Aurora Classifier Co., Aurora, Ill., designed to classify dry, granular materials ranging in size from 10-mesh to 200-mesh. Unlike most forms of air or water classifiers, it does not merely make a single separation between coarse and fine particles, but isolates each size of grains so that any number of separations desired are made in one operation. The principle used is the varying ratio of air resistance to momentum of different sized particles traveling at equal velocities. The essential elements of the machine are a drum having a shallow groove in its rim, three idler pulleys, an endless belt wrapping around the drum and pulleys, and a chute for feeding material into the space between the belt and drum.

New Machinery in 1938

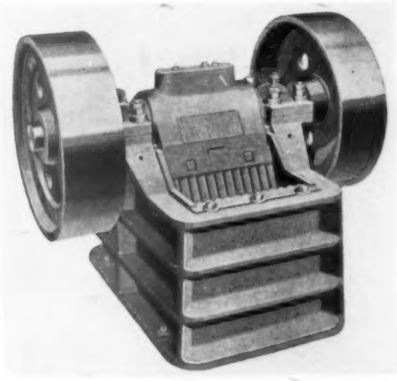
A new means of batch hauling and dumping bulk cement for construction work is provided by a cement bag offered by the Blaw-Knox Co., Pittsburgh, Pa. This bulk-cement container has a capacity of eight standard bags. It is made of heavy canvas, rubberized on both sides to form a weatherproof material, and reinforced as well as multiple-sewed at points of strain or wear. The reinforced hem at the closed end is constructed for bolting to the partition board of the hauling truck. The other end is open and equipped with flap covers. After loading, the end flaps are folded and the weight of the cement pressing against the aggregates seals the bag.



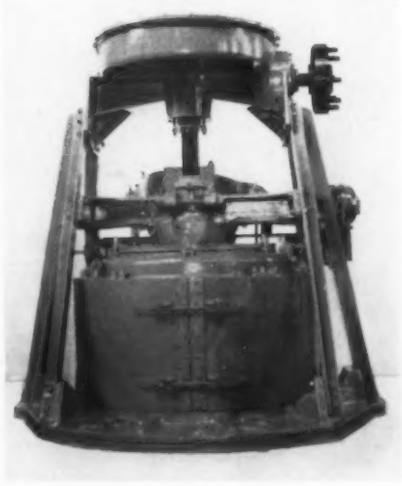
The new Sprout-Waldron vertical-screw elevator provides a method of low-cost, dust-tight, weather-proof handling of bulk materials from cars to storage, or from one machine or bin to another. The entire load on the helical flights is lifted to the discharge and freed instead of part of it surging past the discharge and spiraling downward to make a circulating load as it does in ordinary vertical screws. Another 1938 Sprout-Waldron development was a "saw-tooth" crusher for the reduction of soft materials.



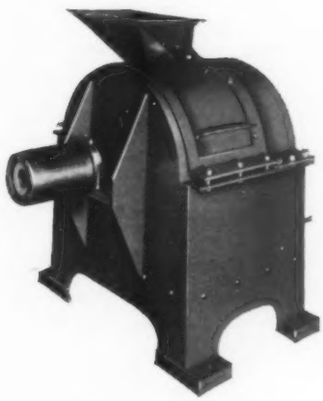
The Ingersoll-Rand Co. announced a new Jackhamer, the JA-35. It is a lightweight yet extremely powerful drill, styled after the widely used JA-45 and JA-55.



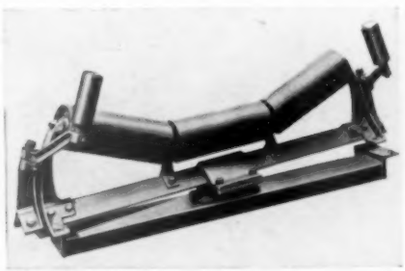
The improved line of force-feed jaw crushers built by the Rogers Iron Wks. Co., Joplin, Mo., includes 14 sizes with jaw openings ranging from 5 in. by 6 in. to 15 in. by 36 in., power requirements varying from 5 to 80 hp. The smallest size will produce from 10 to 15 tons per day of ¾-in. to 1-in. stone while the largest has a capacity of 150 to 220 tons.



The Bradley Pulverizer Co., Allentown, Pa., developed the Junior Hercules mill which is similar in principle to the Bradley Hercules mill. This mill was formerly known as the Bradley 3-roll mill which had a vertical belt drive. In redesigning the mill this drive was replaced with a bevel-gear drive mounted in the top cross bar. While capable of reducing material to a fineness of 70 to 75 per cent. through a 200-mesh sieve, it is most economical when operating to a fineness of 70 to 80 per cent.



A new heavy-duty combination crusher and grinder, announced by Prater Pulverizer Co., Chicago, Ill. Materials entering one end of this grinder are first crushed by short hammers placed close to the shaft. Each succeeding row of hammers is longer, delivering progressively harder grinding blows.



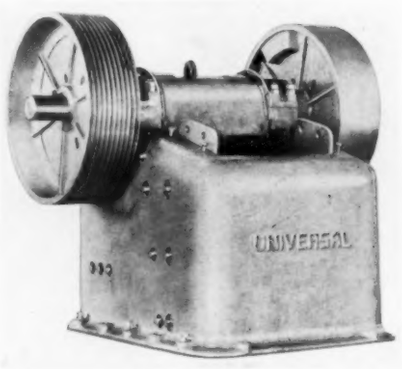
A new self-alining idler for automatically training conveyor belts without damaging the belt, announced by the Jeffrey Mfg. Co., Columbus, O. It consists of a standard anti-friction idler pivotally mounted on a supporting cross member, with guide rolls at each end. As there is no pressure between the guide rolls and belt, there can be no damage to the edge of the belt.

New Machinery in 1938

The new Cedar Rapids stabilizer plant for mixing clay-soils, aggregates, calcium chloride, salt, etc., announced by the Iowa Manufacturing Co. of Cedar Rapids, Ia. After extensive study as to the mechanical requirements of a stabilizer plant, the company claims this plant, with its many distinct features, is adaptable to all operating conditions. Outstanding features are: positive non-clogging clay-soil feeder, accurate proportioning devices, low operating height, a self-contained, highly portable unit, large capacity and low operating costs.

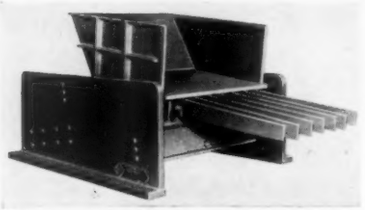
A new portable hoist and material elevator, equipped with scales for proportioning material into ready-mixed concrete trucks, announced by the Concrete Transport Mixer Co. The hopper has a capacity of 2,000 lb. of dry material and 1/2 cu.yd. of concrete. Discharge is controlled by means of the undercut type of gate. Scales are standard equipment on the chassis for weighing aggregates when batching.

The Sullivan automatic Adjust-O-Feed drifter is outstanding because of its ease of handling, its flexibility, and its low upkeep cost. It is said to be the only automatic drifter with an adjustable feed for efficient drilling in changeable rock. It uses a chain drive which does away with the expensive feed nut and feed screw replacements.



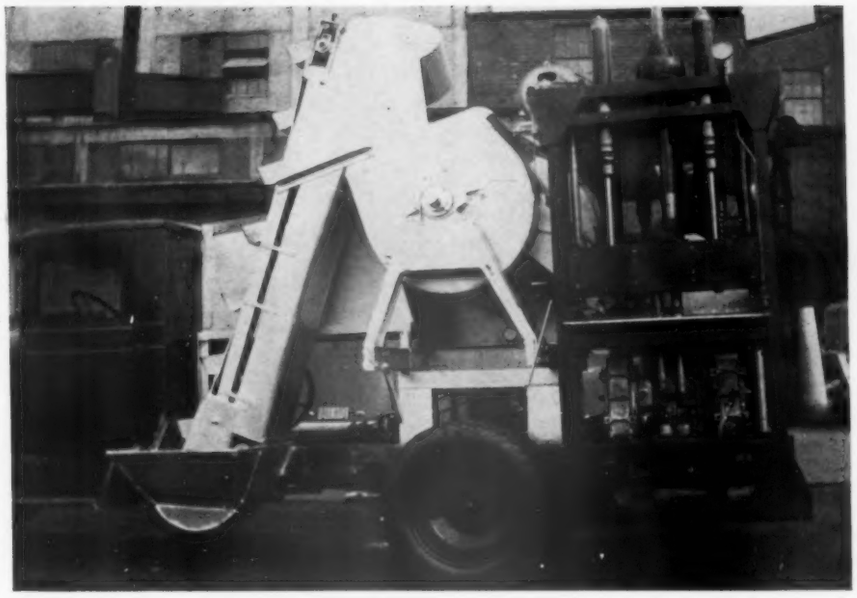
Because the Universal No. 1016 "streamlined" jaw crusher met with such wide favor, and to meet demands for a large "streamlined" crusher, the Universal Crusher Co., Cedar Rapids, Ia., introduced the new No. 2436 "streamlined" crusher with 24-in. by 36-in. feed opening.

This 30-ton gasoline-mechanical 6-wheel locomotive, powered by a Le-Roi 6-cyl. engine, was delivered to the Memphis, Tenn., operations of the Missouri Portland Cement Co. by the Davenport Besler Corp., Davenport, Ia. It was the second to be supplied to the cement company by this concern within a year. It employs standard Davenport-Besler rolled-steel slab frames with axle-hung transmission. All equipment meets I.C.C. requirements.



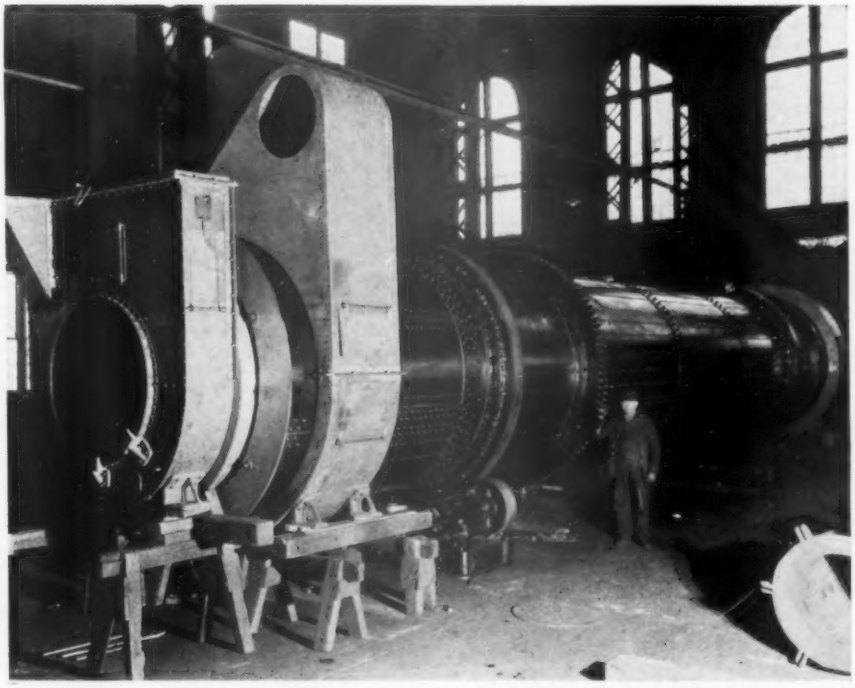
The new Utah electro-magnetic vibrating grizzly feeder made by the Allis-Chalmers Mfg. Co., Milwaukee, Wis., is a combination of its Utah vibrating feeder and cantilever grizzly. The feeders are made in all sizes from 18-in. to 72-in., and for any reasonable capacities.

New Machinery in 1938



A complete concrete-products plant, portable and in one machine, manufactured at the plant of the Concrete Transport Mixer Co., St. Louis, Mo., for the Fireproof Housing Corp., New York, N. Y., marketers of the Scudder System of double-wall construction. Two machines for manufacturing the units are mounted on the frame, both operating from one motor and one mixer. The mixer is one of the regular Concrete Transport machines. By this system, the Scudder units can be cast and stored on the job and a portable concrete-mixing plant is also available for all kinds of monolithic work.

The Allis-Chalmers Mfg. Co., of Milwaukee, Wis., for many years manufacturer of Pulverators (hammer-mills) announced three new sizes of improved design. The pulverizing chambers are 24, 36, and 48 in. inside widths. They are designed to reduce the product of primary crushers where small products with a maximum of fines are desirable. Pulverizing is by impact on involute liners.

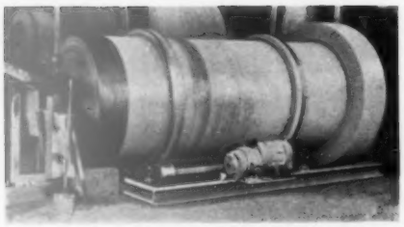


A distinct and practical contribution to the art of drying, with elimination of dust usually produced in the process, is the latest development in Ruggles-Coles driers, manufactured by Hardinge Co., Inc., York, Pa. The Type "XB" drier removes the moisture without necessity of installing elaborate and expensive dust-collecting equipment. These favorable results are obtained due to the design of the drier not allowing the gases of combustion, or large quantities of air, to come in contact with the material being dried. This dustless operation is particularly advantageous where escape of dust would be an expensive loss, and detrimental to the health and efficiency of the employees. Cost comparisons made in a number of plants show that the installed cost of the Ruggles-Coles Type "XB" drier is considerably less than that of the conventional single-shell drier of equivalent capacity.

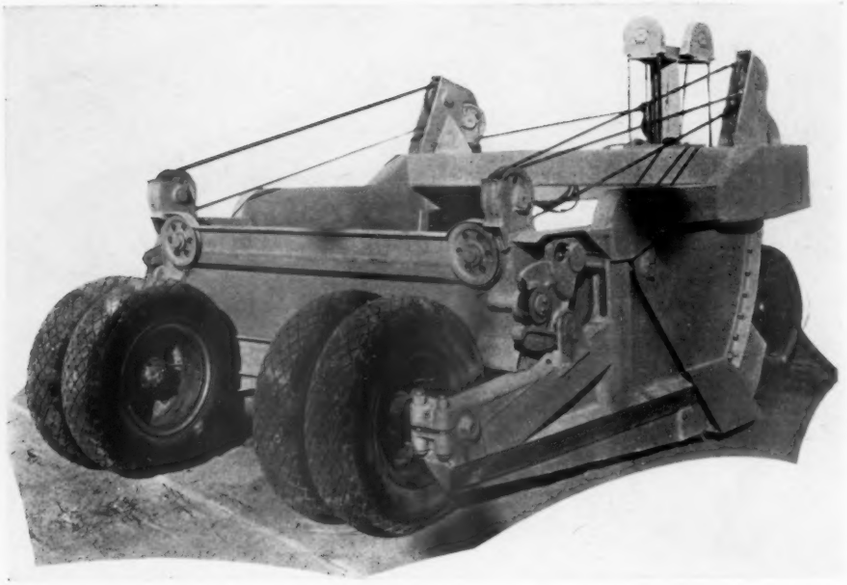
The Harnischfeger Corp.'s new P&H Model 555—said to be the fastest in the 1¼-cu.yd. class. A fully convertible machine with positive chain crowd and tractor-type crawlers, the new 555 gives instant response to controls, effortlessly bites into the toughest banks, has "snap" in starting, stopping and reversing.

The Weaver Manufacturing Co., Los Angeles, Cal., introduced a new impact crusher, adaptable to the reduction of practically all classes of material. Designed to crush more material per hour, from feed size to 95 per cent., ½-in. minus, with low power input.

New Machinery in 1938



Recent improvements in the Hardinge counter-current classifier present very definite advantages. Capacity has been increased for a given size of classifier volume by changing the shape of the spiral attached to the drum and with which it rotates, the spiral rolling the sands from the feed end to the oversize or discharge portion. Decreasing the height of the spiral in the settling zone and increasing it at the oversize end, greatly reduces agitation.

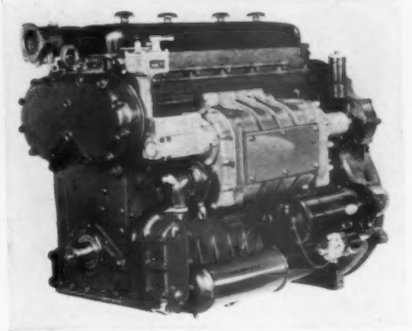


The Emsco Derrick & Equipment Co., Chicago and Los Angeles, announced a new type of wagon scraper which has many revolutionary features incorporated in its design. Made in three sizes—a small, medium and large size unit—it is claimed by the manufacturer that the new Emsco wheeled scraper will carry more dirt per ton of equipment weight than any previously designed equipment for digging, loading and hauling. Furthermore, though light in weight compared to its digging and hauling capacity, the scraper possesses a rigidity and stability that eliminate body distortion.

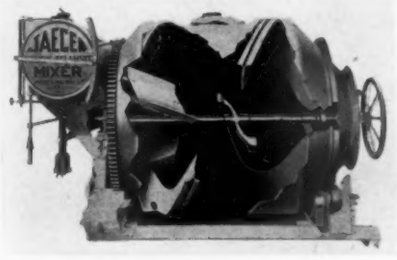
The vibrating screen manufactured by Hanson-Williamson, Inc., of Elmont, N. Y., weighs approximately 1,000 lb. and handles a load of 400 lb. It has a vibrating frequency of about 1,000 vibrations per min. The screen is mounted on eight 4-in. rubber mountings known as Vibro-Insulators, a development of the B. F. Goodrich Co., placed in pairs at each of the corners.

The Hughes-Keenan Co., Mansfield, O., developed the hopper trailer shown above for hauling and spreading stone, gravel and similar material. With specially constructed door and cover, it can also be used for hauling bulk cement where this is to be dumped in a hopper.

New double worm-gear reducers with a large range of speed ratios from 30 to 3,600 to 1, having torque capacities at slow speed shaft from 40 in.-lb. to 400 in.-lb., announced by the D. O. James Mfg. Co., Chicago, Ill.

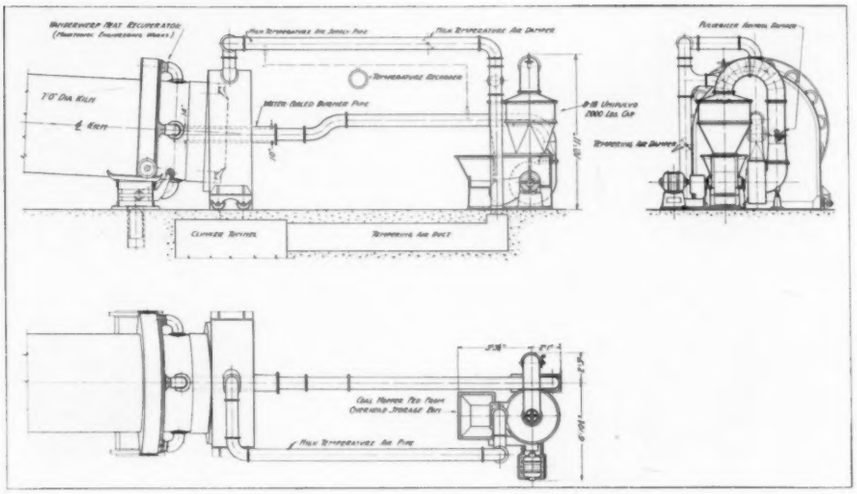


The General Motors Corp. launched a program for the manufacture of a complete line of new lightweight, two-cycle Diesel engines. The production program includes three series of models, based on three different cylinder sizes.

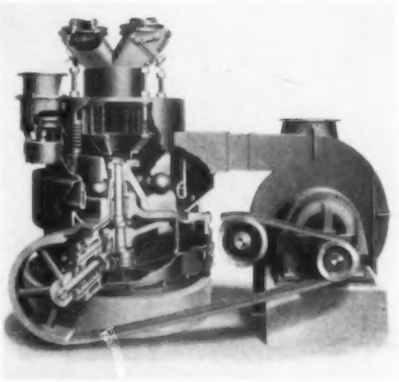


Claiming the biggest basic truck-mixer improvement in years, the Jaeger Machine Co. announced its 1939 models to the trade. Features include: "sypho-meter" water control, dual revolving water sprays, continuous spiral mixing blades and double throwback reversing blades. According to the maker, the water control is accurate within a fraction of 1 per cent. with a full tank.

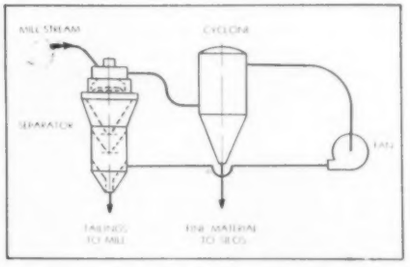
New Machinery in 1938



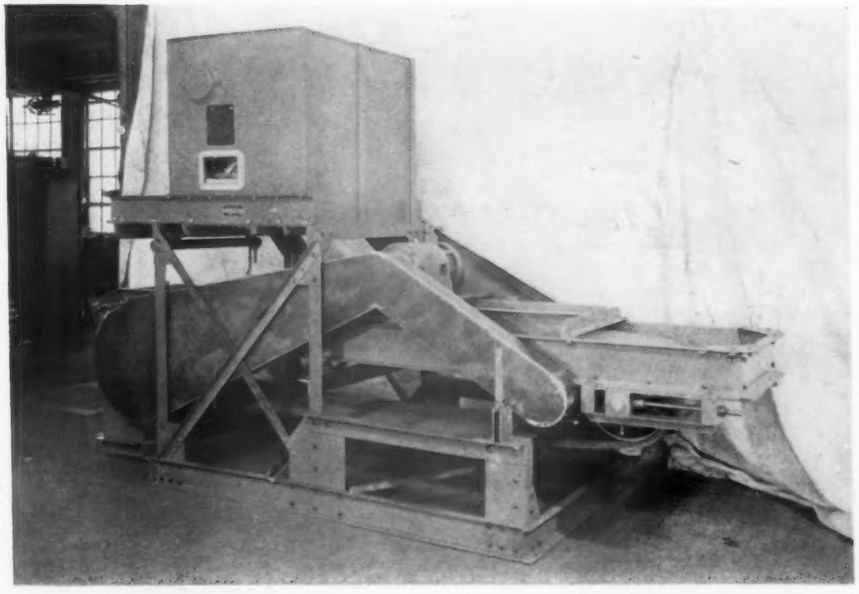
Before wet coal can be properly pulverized surface moisture must be freed so that grinding media can become effective upon the coal particles. Dry material can be more readily pulverized, without wasted power or unnecessary wear on metallic parts of the machine involved in the grinding process. The Unipulvo unit pulverizer, made by the Strong-Scott Mfg. Co., Minneapolis, Minn., has fan capacity sufficient to handle practically all the air required to burn all the fuel pulverized. This relatively large volume of air, preheated, enters the machine simultaneously with the raw fuel, and from that instant until the fuel-air stream is discharged to the burner, hot air and fuel are in constant turbulent contact. The Unipulvo is not a hammer-mill; grinding is effected by a sandblast action of air-swept fuel particles impinging upon a bed of dormant fuel lying in pulverizing chamber. The drawing above shows a typical Unipulvo application to a 7-ft. rotary cement kiln.



A new coal pulverizer characterized by low power consumption, high capacity for a given grinding-ring diameter, and quiet operation, developed by The Babcock & Wilcox Co., New York, N. Y. Known as the B&W Type E pulverizer, it utilizes the ball-bearing principle of pulverizing common to all B&W Type B pulverizers and supplants the latter in certain sizes.



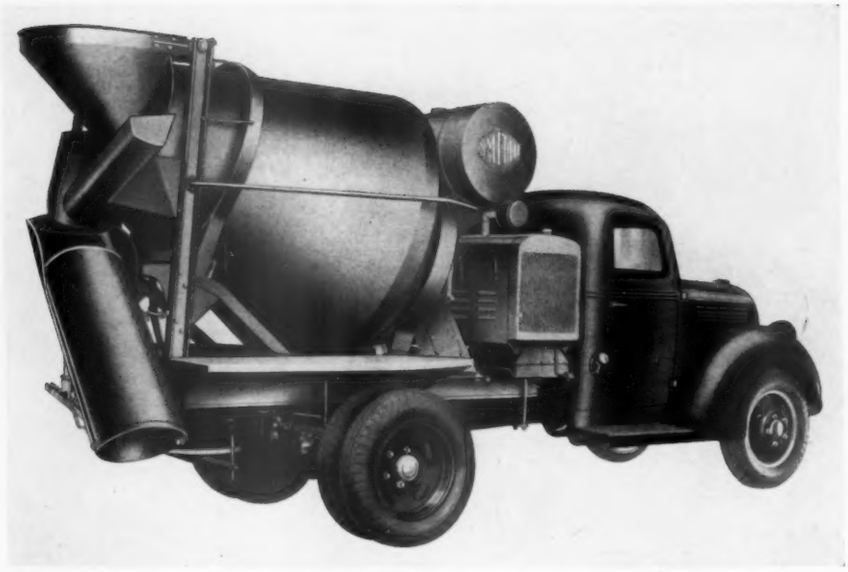
A number of new features have been incorporated in the F.L.S. multi-stage air separator, announced by F. L. Smidth & Co., New York, N. Y. These include the use of successive separating chambers, a specially designed cyclone for precipitation of the fines, and an adjustable air current from an independent fan.



Of particular interest to the cement manufacturer is the new pivoted-type conveyor Weightometer, a self-contained unit shown in the accompanying picture. It is manufactured by the Merrick Scale Manufacturing Co., Passaic, N. J. This automatic-weighing equipment can be located at any convenient point to receive cold clinker from conveyor or storage bin and weigh it before it is delivered to the mill for grinding. Can be installed where space is limited and where the conventional type of conveyor Weightometer could not be accommodated. Variable tensions in the conveyor belt have no adverse effects on weighing, for the reason that the entire conveyor unit is supported from the weighing equipment, the receiving end resting on a fixed pivot with the head of the conveyor suspended from the Weightometer. Tare weight of the conveyor can readily be balanced out, the weighing machine therefore recording only the net weight of the material carried over the conveyor. One of these machines recently went into operation at the Bellingham, Wash., plant of the Olympia Portland Cement Co., and two more were installed for weighing clinker in a wet-process plant just completed.

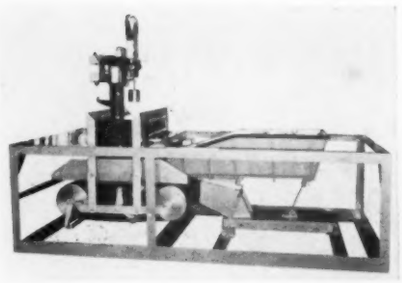
The Lima Locomotive Works, Inc., Lima, O., announced a new convertible, ¾-cu.yd. shovel, drag-line, crane and pull-shovel known as the Paymaster. Anti-friction bearings are used at all important bearing points, including drums. The rotating base is a one-piece casting.

New Machinery in 1938



The T. L. Smith Co. announced a new type of truck-mixer and agitator, revolutionary in design, the Smith-Mobile. Although entirely new in principle of operation, the Smith-Mobile is said to incorporate all the desirable basic features of the conventional truck-mixer plus many new refinements that make for greater speed and efficiency in concrete delivery. The unique, duo-cone mixing drum is equipped with a combination charging chute and sealing door. There is no hatch to open or close. The drum rotates during the charging operation and mixing starts the instant the materials enter the drum, resulting in a greater capacity for a given drum volume.

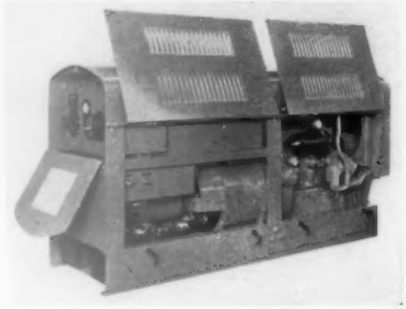
A new full crawler-mounted, self-feeding bucket loader, Model 552, announced by Barber-Greene Co., Aurora, Ill. The bucket loader has many advantages contributing to its high speed and low cost operation. It operates continuously, giving a steady flow of material. Spirals are self-feeding.



An automatic, continuous weigh-feeder that provides a steady flow of bulk materials by weight to a constant, close accuracy, made available by the Syntron Co., Homer City, Pa. The machine is made up of a vibratory feeder-conveyor discharging on a constant-speed belt-conveyor suspended from a scale having sensitive electric valves.

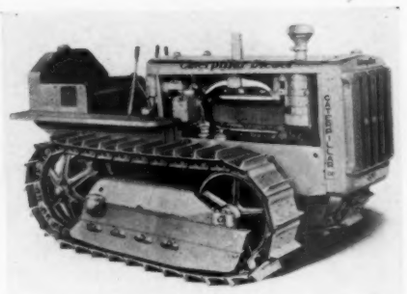
A new excavator in the ¾-cu.yd. class—the General 41—announced by the General Excavator Co., Marion, O. It is characterized by high speed and mobility. Two travel speeds are obtained through speed change gears and the engine can be quickly accelerated.

The Model 36 Hug "lugger," a specially designed heavy-duty dirt- and rock-moving unit, equipped with a 10-12 cu.yd. Boulder Dam-type body, with twin-cylinder hydraulic power hoist.



Diesel-driven arc welder, a 1938 development of the Lincoln Electric Co., Cleveland.

The Hanson Excavator Works, Tiffin, O., began production of a new ⅜-cu.yd. excavator named the "Comet" available in any combination of a shovel, crane, clam-shell, drag-line, pile-driver or trench-hoe.



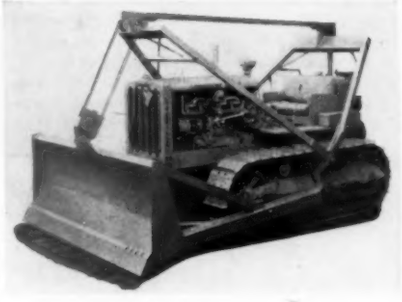
Reduced operating cost appeals to every owner and the new Diesel D2 tractor by Caterpillar Tractor Co. will interest everyone. This 25-hp. tractor will operate under normal load on 1¼ gal. of Diesel fuel an hour.

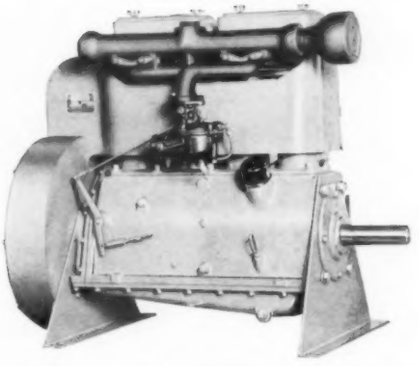
New Machinery in 1938

New truck-mixer announced by Transit Mixers, Inc., New York, N. Y., which employs a centralized control and a new discharge door designed to speed up discharging and give improved control for partial discharge into small forms. Another new feature is an improved water-control device which may be manually set for introduction of any desired amount of water into the mixing drum and functions automatically thereafter. The water pump is capable of discharging as much as 75 g.p.m. into the drum.

A new ¾-cu. yd. shovel weighing 36,000 lb. announced by the Byers Machine Co., Ravenna, O. It is called Model 83 and is convertible to all boom attachments. It uses a 72-hp. gas or Diesel power plant.

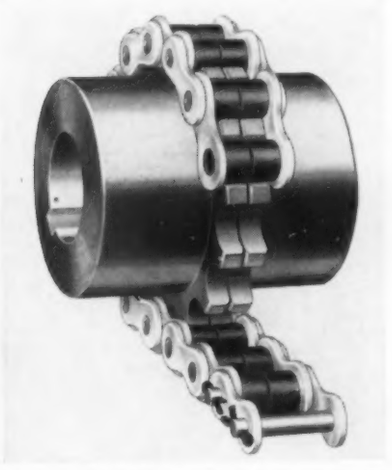
RIGHT—Built to incorporate the most practical structural features of all previous models, a new type of angledozer and bulldozer, Type C, was added to the line of R. G. Le Tourneau, Inc., for use on Caterpillar D4, D6 and D7 tractors. Both the angledozer and bulldozer utilize a bowl-and-yoke structure similar to that of the current track type, but the bowl is supported by an overhead A frame rather than by two side arms.





The Wisconsin Motor Corp., Milwaukee, Wis., added a 4-cyl. air-cooled engine to its line, providing a range of air-cooled engine sizes from 1 to 28 hp., in 1- and 4-cyl. models.

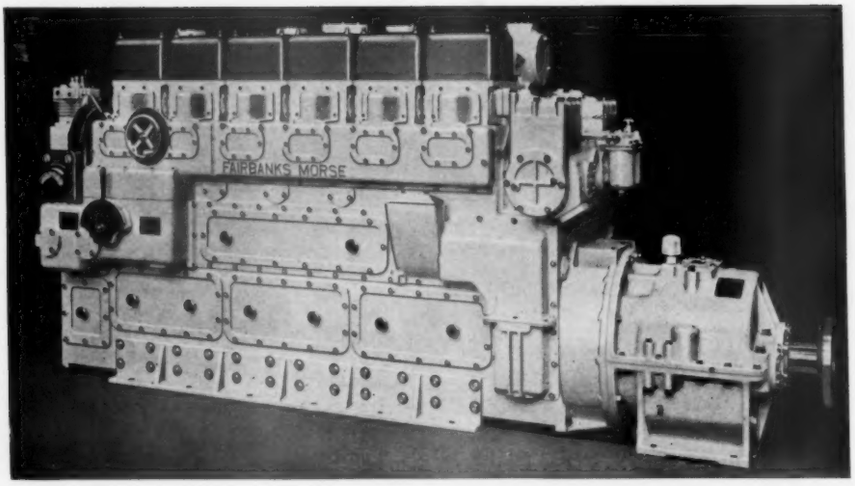
New Pioneer No. 73 stabilizer plant for mixing aggregates, clay, calcium chloride or salt to produce a stabilized paving mixture. The folding delivery conveyor at the right delivers the finished product to trucks which transport it to the grade where it is spread, rolled and compacted to set up a firm, dustless thoroughfare.



The Link-Belt Co., developed a new flexible coupling, Type RCB, which embodies major improvements over the company's Type RC roller-chain coupling long furnished for connecting shafting in line.

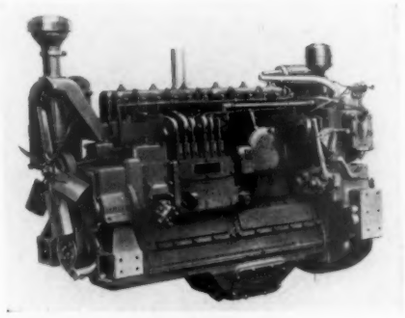
New Machinery in 1938

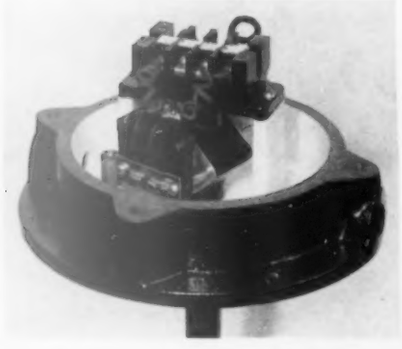
The latest mechanical improvements are incorporated in the improved Model C Leahy heavy-duty vibrating screen made by the Deister Concentrator Co., Fort Wayne, Ind. The screen consists of three essential elements: (1) main screen frame, (2) vibrator, and (3) free-swinging screen jacket. Within the main frame the free-swinging screen jacket is tensioned. The vibrator imparts its differential vibration to this jacket through a heavy connecting rod which at its lower end is attached to a rigid member extending transversely across the underside of the screen jacket. A more recent model has the motor mounted on the screen frame, the vibrator being driven by V-belts.



Fairbanks, Morse & Co. announced a series of four-cycle, vertical, convertible Diesel and gas engines. This Model 36-A-8 size fills a definite need in the 200- to 300-hp. range. Built in both 6- and 8-cyl. combinations, with 8-in. bore and 10½-in. stroke, they develop 35 hp. per cyl. at 720 r.p.m. Smaller sizes of Diesel are available in ratings as low as 8 hp. Both Diesel and gas engines in the new 8-in. cylinder size are offered for stationary service, and the Diesels are offered for marine propulsion and in complete, unit-built Fairbanks-Morse generating sets as well.

Adding to its line of industrial Diesel engines, the Caterpillar Tractor Co. announced a new, 6-cyl., 66-hp. model known as the D4600. The engine is of the four-stroke-cycle, valve in head, water-cooled design, and features solid injection of the fuel into precombustion chambers. The fuel injection system is similar to that of all Caterpillar Diesels.

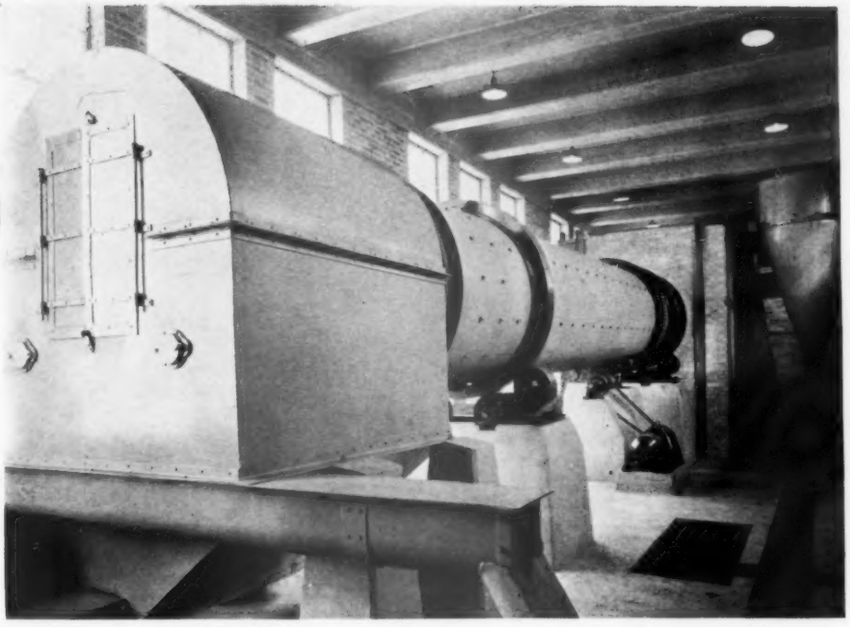




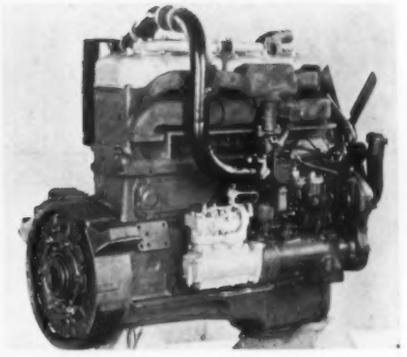
The Fuller material-level indicator is a new device employed to control conveyor motors, valve circuits, etc., or give audible or visible warnings when the material reaches or falls below a predetermined level in a bin. This indicator, positive in operation, will not make a false indication in the event of a momentary surge of material in the bin, nor indicate a low level when an aerated pulverized material settles. One or more circuits, such as signal, motor control, valve control, or the like, can be opened or closed by the same indicator. The necessity for relays has been eliminated, as the switches are positively held in the desired position when the material is above or below the predetermined level. The switches may be actuated instantly when the material level reaches the indicator or may, by adjustment, be delayed for any interval up to 10 seconds.

Speed and low-cost operation are feature advantages of the Brooks Load Lugger. One truck alone can service 5 to 10 bodies, depending upon the material to be loaded and the distance hauled. In one stone quarry one 1½-ton truck and driver are taking care of seven 1¼-ton buckets, transferring an average of 250 cu. yd. daily from points of loading to crusher. No counterweight is required in front of the truck or elsewhere. It employs direct drive from a power take-off to the hydraulic pump-hoist assembly and requires no high-pressure hose connections. The lugger has no cables or sheaves—thereby precluding the possibility of expensive replacements and chances of breakage.

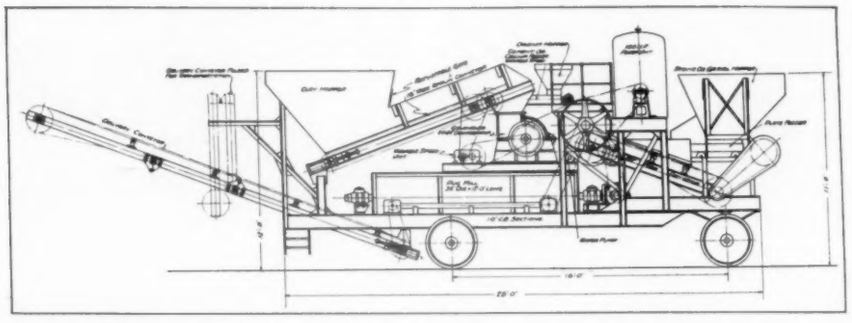
New Machinery in 1938



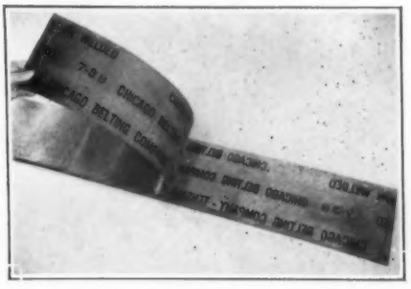
To retain the advantages of the double-shell or central-tube drier and remove inherent construction weaknesses, the Louisville Drying Machine Co., Louisville, Ky., has developed the Type L drier, shown above. Hot gases are carried around the feed end of the shell by means of a casing and thence through openings in the shell through a series of longitudinal conduits of special cross-section fastened to the interior of the shell. Cooled gases are exhausted by a fan. Tests have indicated its thermal efficiency to be about 85 per cent.



Two new truck engines were recently announced by Mack Trucks, Inc., the Thermodyne gasoline model illustrated above, and the Mack-Lanova Diesel. High horsepowers, ranging from 145 to 180, are the feature of the Thermodyne while the Diesel which employs the Lanova energy-cell combustion system is made in one 6-cyl. model developing 131 hp. at 2,000 r.p.m.



The Gruendler portable plant for stabilizing road material consists of a calcium-chloride feeder, clay pulverizer, pug mill, pump, conveyors and power unit all compactly mounted on a portable steel truck. The drawing above shows a cross-sectional sketch of the equipment.



The Chicago Belting Co. now brands all its double belts with a "between-the-ply" brandmark. The name is printed on the inside of the belt as the double belt goes through the tension cementing machine where the two plies are cemented together under tension to eliminate belt stretch.

The Strayer portable concrete-mixing plant has a capacity of 32 cu.yd. per hr. and is completely portable as the above illustrations show. Built to comply with the most exacting concrete specifications, it meets regulation highway clearances when being transported. It is manufactured by the Erie Steel Construction Co., Erie, Pa.

"NON-STOP-RUNS"

For greater profits in 1939, specify the Dixie Non-Clog Hammermills to insure continuous, trouble-free service under the most punishing conditions. "Crushing superiority" is due to the movable breaker plate which gives 26 times the wearing area of standard plates and is practically indestructible. The Dixie Hammermill will handle wet or sticky material without clogging or slowing production.

FORTY SIZES — a full range of capacities for primary, secondary or fine reduction.

Don't "second guess" in choosing the best answer to your crushing problems—be right the *first* time with DIXIE!

Write for Catalogue

DIXIE
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4310 GOODFELLOW AVE.
ST. LOUIS

Tractor unit and scraper.

• Hauling Unit

A radically new and different materials-hauling unit, known as the Tournapull, has been introduced by R. G. LeTourneau, Inc., of Peoria, Ill. In it, "Caterpillar's" largest Diesel engine, 160 h.p. is geared to the world's largest tires, 80 in. in diameter, to give a loaded hauling speed of 17 m.p.h. This speed obviously compares very favorably with that of large trucks of less capacity. In addition, the Tournapull is able to negotiate adverse ground conditions that are impossible for the road-bound trucks.

Tractor unit and trailer.

Maximum traction is gained by the unusual design. The entire weight of the overhanging engine together with much of the weight of the load is placed on the two large driving wheels to give the greatest possible traction per pound. The low-pressure earth-mover tires spread the tread over a large ground area under the weight of the unit and the additional weight of the load, thus increasing gripping power and traction. In this way, an unusually high ratio of traction to weight is secured.

Tournapulls are steered much like track-type tractors—by independent control of each wheel. However, they have an additional feature not found in conventional tractors. One wheel may be held stationary and the full engine power transmitted to the other. Thus, on grades so steep or in muck and mire where the trucks might be stopped or bogged down, the Tournapull is able to "wiggle its way out" by a series of semi-circular movements.

Interchangeable hauling units are constructed for the Tournapull, the Tournatrailer and a Carryall scraper. The large Tournatrailer, as used by the Alpha Cement Co., of LaSalle, Ill., is a 30-cu.yd. rear-dump buggy consisting of a bottomless body sliding over a fixed bed —the bottom. The second unit is the U-type, double-bucket, 30-cu.yd. Carryall scraper adapted for Tournapulls.

• Dust Collectors

The handling of the dust problem on tripper belt discharges is very difficult in some plants where a large number of bins are serviced. It has been found in many cases that merely venting the bins is not always satisfactory without covering the openings through which material is charged.

The Western Precipitation Co., Los Angeles, has recently developed and installed a mobile dust-collector unit consisting of a combination of Multiclones followed by bag filters. The whole arrangement is built on a car which moves with a tripper. It is arranged to take dust from ahead of the tripper and vent the bin, discharging collected dust continuously and automatically back into the particular bin so that the various materials can be run over the belt into different bins with no danger of contamination.

Another 1938 improvement was the variable-volume Multiclone which maintains constant dust collection efficiencies over a range of capacity from 100 to 20 per cent. of rating.

PERFORATED METAL SCREENS
FOR SAND, GRAVEL STONE, ETC.
Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
Prompt Shipment
CHICAGO PERFORATING CO.
2435 W. 24TH PLACE CHICAGO, ILL.
Telephone CANAL 1459

• Electric Ear

The Electric Ear developed by the Hardinge Co., York, Pa., is a device that controls the feed to a mill by "listening" to its sound. This device, like the operator, when he listens to the mill, reduces the feed rate when the mill sounds "dead" or too quiet, and increases it when the sound is too great. In other words, it automatically maintains the sound within the mill at any level desired by the operator. One adjustment only is required. This keeps the mill operating at the greatest point of efficiency at all times, resulting in greater capacity, better control of fineness and lower lining and ball or pebble consumption. The operator also has more time to tend to his other duties.

The mill need not be stopped to install the Electric Ear. A microphone is placed near the mill at the point where the grinding media strike the shell, in order to pick up the sound. The sound is converted into electrical energy in the control cabinet where through appropriate electrical circuits a power switch is controlled within the cabinet. This switch actuates the feeder motor.

Adjusting and connecting the unit into service is very simple. After the Electric Ear cabinet is connected up with an energizing circuit, the operator reads the amount of noise produced by the use of a meter on the cabinet at a time when grinding conditions are considered normal. By turning the dial he then alters the energy within the circuit so that the

The electric-ear control equipment.

meter reads at a pre-determined value, which value is the cut-off point of the power switch. An increase in the noise level within the mill, (under-feed), will cause the power switch to close, thus actuating the feeder, and conversely, a decrease in the noise level will cause the feeder to stop functioning. At the time the feeder is connected to the power switch, the feed rate is immediately increased twenty or thirty per cent. so that there will always be a tendency toward over-feeding, which tendency is corrected by the Electric Ear by stopping the feeder at short intervals. The Electric Ear is so sensitive that the feed is usually shut off from two to twenty seconds at a time, unless a radical change in the character of the ore occurs. Once the unit is placed in operation and a record is kept of the average capacity at any one noise level, it is a simple matter to pick out the best noise level and adjust the unit to that level and leave it alone.

The advantage of an operation under this condition is obvious, particularly when the operator tends several mills at the same time, or other equipment, and when ore constantly changes due to bin segregation, size of feed and hardness.

The Combustion Engineering Co., Inc., has opened its own branch office in Birmingham, Ala., under the direction of J. B. Emory as district manager.

You don't have to take our word for it.

Let's see what producers say about

DEISTER PLAT-O VIBRATING SCREENS

In February, 1938, Field Brothers, general contractors of Lubbock, Texas, wrote us as follows:

"In 1932 we purchased from you one four foot by twelve foot Plat-O Vibrating Screen, Type 1-4-12, single deck. This screen has been one of the most satisfactory pieces of equipment which we have ever used."

In November, 1938, Memphis Stone and Gravel Company, Memphis, Tennessee, which has been purchasing Plat-O Screens since 1932, advised us as follows:

"If you ever need a recommendation for your screen on a job using a very sticky clay gravel type material, which we have found is a great deal more difficult to screen, we would be very glad to furnish it.

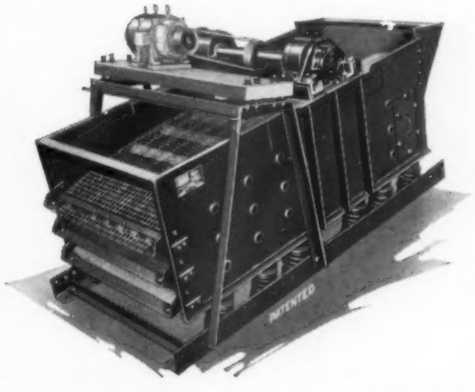
"We are very glad to give you such a favorable report for in our mind there is no question of the vast superiority of your screen handling our type of material."

SEE US AT

BOOTHS 50 & 51

NATIONAL SAND & GRAVEL SHOW

CINCINNATI



DEISTER MACHINE COMPANY

1933 E. WAYNE ST. FORT WAYNE, IND.

The MASTER SCREEN for.... FINE SCREENING

THE Leahy HEAVY DUTY

V-BELT MOTOR DRIVEN VIBRATING SCREEN

Write for Bulletin

¶ ATTENTION! Sand and Gravel Producers:

¶ If what you want is **fine screening** and **close grading**, why not employ the one screen on the market that is designed expressly for doing this job at lowest cost!

¶ It's the new V-Belt Motor Driven type of the famous Leahy NO-BLIND Vibrating Screen—a masterstroke of engineering that comes from 32 years' experience.

¶ It has true differential vibration with the movement confined to the free-swinging screen jacket, where the actual screening is done with only one-half horsepower. The Vibrator is foolproof, running in oil and sealed against dust.

¶ Built to "stand the racket," the new Leahy Heavy Duty Screen will give you accurate grading of material as fine as your specifications can possibly demand—will insure steady operation, and keep maintenance costs annually as low as 1% of the original investment.

The Original

DEISTER CONCENTRATOR COMPANY

911 Glasgow Ave. Inc. 1906 Fort Wayne, Ind.

Profit-Producing Equipment by CONCENCO

Spray Nozzles • Duplex Washing Tables • Leahy Screens • Constriction Plate Classifiers

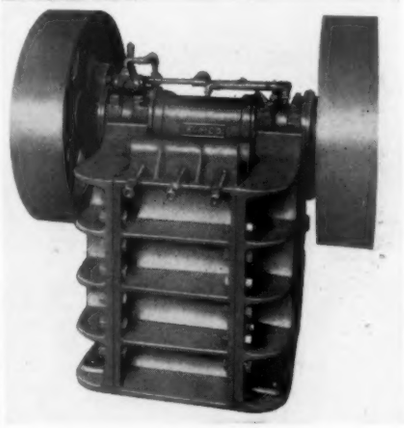
Microphone installed beneath ball-mill.

• Jaw Crusher

In the design and construction of the new Eimco jaw crusher full advantage was taken of wide previous experience with other types of jaw crushers heretofore used throughout the mining and pit-and-quarry industries. All fundamental features which had proved dependable and desirable in severe service were adopted, while many other features introduced from time to time by other manufacturers were considered and discarded. The simple sturdy design eventually developed not only gives high, efficiency at moderate initial cost, but also assures lowest possible operating and maintenance expense.

The distinguishing feature of this crusher is the use of automatic force-feed lubrication, together with a distinctive type of oil-sealing ring for which patent applications have been made, and which has proved extremely effective in preventing oil leakage and contamination of the oil by dust.

Tests show that the mechanical efficiency of the crusher compares favorably with that of expensive crushers equipped with anti-friction bearings. The selling price, however, is



Automatically-lubricated jaw-crusher.

considerably less, and the maintenance expense, over a period of years, is also expected to be less than for roller or ball bearing construction.

Since the swing-jaw plate, especially at its lower end, is subject to greater wear than the stationary-jaw plate, the two plates have been made easily interchangeable and reversible end for end. Changing the jaw plates about at suitable intervals assures even distribution of wear and maximum possible service life.

The new crusher is a product of the Eimco Corp., Salt Lake City, Utah.

Personal Mention

L. S. LEE has moved from Rogers City, Mich., to Buffalo, N. Y., where he is now in charge of the ground-limestone plant of the Michigan Limestone & Chemical Co.

JACK BARAB, formerly manager, technical division, Hercules Powder Co., and J. J. KELLEHER, former manager of the contractors' division of the same concern, have become associated with the National Powder Co. through their KelBar Powder Co. of Wilmington, Del. Another former Hercules man, CHARLES GURNEY, is now works manager for the National Powder Co. at Eldred, Pa.

DAVE BUTTLES of Seattle, Wash., for the past four years factory sales and service manager for 11 western states, has been appointed national sales manager of the Cummins Engine Co., with headquarters at Columbus, Ind.

Dave Buttles

Mr. Buttles' record as service manager for one of the large Diesel truck fleets on the Pacific Coast several years ago attracted the attention of Cummins company and he developed into one of the company's outstanding salesmen. He knows the Cummins Diesel from top to bottom and is thoroughly familiar with its sales or service problems.

J. J. URSCHEL, president of the Woodville Lime Products Co., Toledo, O., has been elected commodore of the Toledo Yacht Club.

DR. EDWARD R. WEIDLEIN, director, Mellon Institute, Pittsburgh, Pa., has announced the establishment of an industrial fellowship in that institution by the American Air Filter Co., Inc., of Louisville, Ky. This fellowship will investigate broadly materials of value in the construction of filters for air-conditioning systems. DR. FRANK F. RUPERT, who has been appointed to the incumbency of the Fellowship, has been a member of Mellon Institute since 1913.

Another Satisfied NATIONAL Explosives User

"We wish to state that we are pleased with the quality of your explosives and the service rendered by you in prompt deliveries.

"We have found your forty percent special ammonia gelatin to be fresh, strong and quite effective for the blasting of Limestone drilled to twenty foot depth by wagon drills."

—this report from Federal Crushed Stone Corporation.

Actual field work furnishes the best test for comparative efficiency in blasting operations. Positive results demand **superior** explosives, distinguished by their unvarying strength and resistance to deterioration.

Many concerns like Federal Crushed Stone Corporation above have found that National High-X-Plosives are always reliable "on the job"—where you want it. Depend upon National—if you have important blasting work to do!

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NATIONAL POWDER COMPANY

- Nitroglycerine and Ammonia Dynamites
- Gelatins and Semi-Gelatins
- Flo-Free Powders
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- Blasting Supplies

NATIONAL POWDER COMPANY

Executive Offices
DUKE CENTER, PA.

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The extra STRENGTH is in the Spiral

THE once necessary evil of using *heavier* pipe than was needed in order to obtain the required *strength*, was wiped out when Taylor Forge pioneered spiral pipe.

That spiral seam makes it possible to produce a pipe that is light walled and therefore less expensive to buy, ship, and use—yet strong in every way, thanks to the spiral reinforcement which stiffens it from end to end—holds it round and true against collapsing strains—gives it bursting strength even beyond that of a seamless tube of equal gauge.

You simply choose the gauge you need for the job, never paying a penalty for superfluous weight. Let it cut the cost of water, sand and gravel lines. Ask for the new Catalog 36.

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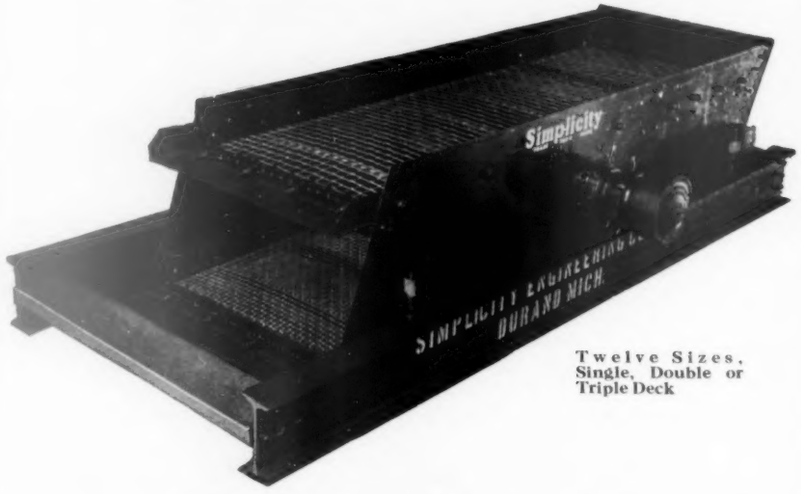
TAYLOR Spiral PIPE

ASK FOR CATALOG 36

GYRATING SCREENS

SIMPLICITY

THE KEY
TO SUPERIOR RESULTS IN SCREENING OPERATIONS



Twelve Sizes, Single, Double or Triple Deck

Let Simplicity Engineers open the door to better profits for you in 1939. They have pioneered and developed many important features in screening equipment, and "know all the answers" to every problem you may have requiring a grading or separating action.

Note these salient factors in establishing superiority of Simplicity Gyrating Screens:

(a) Counter-balanced eccentric shaft assures positive screening action and smooth operation.

(b) Rubber mounted screen corners eliminate excessive structural wear and stop vibration from reaching the frame work.

(c) Screen cloth has four-way tension, preventing cloth sag and wire whip. Use of lighter and stronger wire increases capacity and eliminates blinding.

(d) Dust sealed high-grade anti-friction bearings carry gyrating assembly. Alemite lubricated.

(e) Extra rugged, all steel construction insures durability and maximum repairs.

(f) Many Simplicity Screens have operated five seasons or more without overhauling.

SIMPLICITY CAN MAKE ANY GOOD YEAR BETTER!

SIMPLICITY ENGINEERING COMPANY
DURAND, MICHIGAN

DALE B. CORNICK has opened a new plant for the manufacture of concrete blocks at Derby and Thirteenth Sts., Pekin, Ill.

EVERETT MOSES, formerly manager, eastern division, Dempster Bros., Inc., has been appointed as Northeastern Representative for the Brooks Equipment & Mfg. Co., of Knoxville, Tenn. G. V. ALDRIDGE, formerly in the sales department of the Hug Co., joined the Brooks concern. He will specialize in the sales of the Brooks Load Lugger in the Southwest and on the West Coast.

WALTER B. STRONG, formerly manager of the export division, has been appointed assistant general sales manager of Worthington Pump & Machinery Corp.

JUDSON R. GILES, an accountant for the Pennsylvania-Dixie Cement Corp. died recently of a heart attack at his home in Nazareth, Pa. He had been employed by the cement company for 31 years.

JOHN M. NORTHMORE, 76, vice-president of the old Producers Stone & Gravel Co. of Chicago, who retired from business in 1930 and moved to California, died at his home in Long Beach, Cal., in November.

EDWARD P. ALKER, 51, former vice-president and treasurer of the Pennsylvania-Dixie Cement Corp. died at his Great Neck, L. I., home recently.

FERDINAND H. BUSCHING, 60, secretary of the Cleveland Quarries Co., died recently at his home in Lakewood, O.

MASON B. GIBERSON, SR., organizer and president of the National Foundry Sand Co., Detroit, Mich., died recently in a Detroit hospital following a short illness.

TRADE NOTES

The Easton Car & Construction Co., Easton, Pa., maker of materials-handling equipment, recently observed its twenty-fifth anniversary. Organized in 1912, under the management of Ernest Weiner Co., New York, the plant was purchased a year later by W. E. Farrell, who has been president ever since.

Three new dealers have been announced by Simplicity Engineering Co., Durand, Mich., for screen sales to the aggregate industry as follows: J. E. Ingraham Equipt. Co., San Antonio, Tex.; The Rix Co., San Francisco, Cal.; and Contractors' Equipt. Corp., Portland Ore.

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are the modern means of producing extremely fine products and increasing Mill capacities. Tell us of your problem.

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ROADS whether mountain or farm to market under any condition
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GRUENDLER EQUIPMENT
Established 1885

PORTABLE
HAMMER CRUSHERS
Ideal for farm to market road work. Crushes stone 2½ inch down to agriculture dust.

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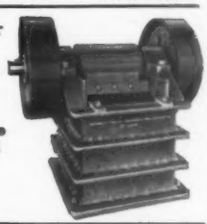
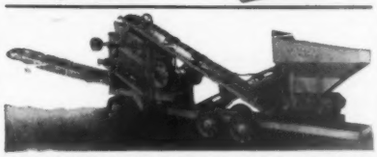
JAW CRUSHERS
Heavy Armor plate steel or cast steel Constructed
Large capacity
Small power Requirements





STRAIGHT LINE ROCK AND GRAVEL CRUSHING AND SCREENING PLANTS

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GRUENDLER CRUSHER & PULVERIZER CO.
2915-21 N. Market St., St. Louis, Mo.

Traffic News Digest

LEGISLATION

While it is certain that transportation legislation will be among the most important subjects to be considered by the new congress it is very doubtful whether many bills will be passed. However those that are passed should be a far reaching influence on the railway problem. Among those which seem at this time to have a good chance of becoming laws are bills dealing with consolidation, repeal of the land grant statutes, loans to railways, grade crossing elimination and construction or reconstruction of bridges.

There has been so much opposition both from carriers and shippers to the present law giving the Interstate Commerce Commission power to prescribe consolidations that it will probably be modified to permit the railroads to consolidate as they desire unless the Commission finds that such consolidation is not in the public interest.

When railroads were first constructed the lines were in many cases given outright grants of land by the government. This was true particularly in the territory west of the Mississippi. In return for these land grants the carriers agreed to haul government freight at a reduction in rate over the published rates applying to the general public on like traffic. The carriers contend that at that time it was expected that this traffic would consist principally of supplies and materials for the army and navy but that owing to government activities in so many fields including W.P.A., P.W.A., T.V.A. and other agencies the reduced rates have amounted to many times the values of the original land grants and that these special concessions to the federal government should be eliminated.

Since shippers organizations and railroad-labor organizations are joining the carriers in asking for repeal of these land grant rates it is probable that the new congress will accede to these wishes.

Just what will be done toward giving financial assistance to the carriers is problematical. The Railway Business Assn. favors a 3- to 5-yr. subsidy. This method of financing would probably be approved by labor since one prominent railway labor leader is said to have recommended that railway management and labor join in getting some of the money that the federal government was spending for the raking of leaves. Since President Roosevelt has been opposed to any subsidy it is not likely that any subsidy will be granted. It is however reasonable to assume that the railroads will be granted long time loans with low interest rates by the government.

There seems to be a decided tendency on the part of those discussing railway problems to take the view that it is unreasonable for the railroads to stand the cost of railway crossing eliminations where the railroads themselves do not obtain any direct benefit from this elimination. The same holds true in the case of bridges built or reconstructed on account of the federal improvements of water-ways. Legislation probably will be enacted relieving the carriers of the expense of construction or reconstruction of such grade crossing elimination projects and bridges except to the extent that

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ARNOLD & WEIGEL
Incorporated
CONTRACTORS and ENGINEERS
Located at
WOODVILLE, OHIO, U.S.A.

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..The Pipe with the exclusive WELD STAMINA that protects your lines .. another reason to specify Naylor!

Sizes from 4" to 30" in diameter with all types of fittings and connections. Complete fabrication service. Quotations on your requirements furnished promptly.
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the railroads directly benefit by such construction.

The Pettengill Bill repealing the long-and-short-haul clause of the fourth section of the interstate commerce act will be introduced and has a fair chance of being passed. Since Mr. Pettengill will not be in the new congress it will be known by some other name.

Legislation for the regulation of water carriers may be enacted. Sale of the government barge lines to private interests will be proposed as will a bill providing for the charging of tolls for the use of inland waterways other than harbors and the great lakes, and a bill providing more flexibility in rate making for rail carriers. All of this proposed legislation has a fair chance of being enacted. The rail carriers are behind all of these proposals and railroad labor is expected to endorse them.

It is probable that the President will ask that some of the authority be taken from the Interstate Commerce Commission and given to the executive department of the government. In his message to congress on April 11, he stated that in all probability a number of purely executive functions of the commission were unconstitutional. He suggested that these executive functions related to all transportation be vested in a federal department such as the Department of Commerce, the Department of the Interior, or some other old or new department. At this time such legislation may be placed on the doubtful list. In order, however, to secure the President's approval on other legislation this proposal might be included.

Any proposal to eliminate the length of trains or other labor proposals which would greatly increase transportation costs have very little chance of passing either house, since it is generally agreed that railroad labor has been well taken care of by the management withdrawing the notice of wage reductions.

President Roosevelt has appointed a committee of five including Dr. Julius H. Parmellee, director of the Bureau of Railway Economics and two representatives each of railway management and railway labor to make a report to him on legislation necessary to improve the condition of the railroads. It is expected that the committee will report shortly after congress convenes and that the President will send a special message to congress on the subject of transportation legislation.

Action has been taken by the transportation conference called by the Chamber of Commerce of the United States, also by the National Industrial Traffic League and by the Mississippi Valley Assn., recommending or condemning various legislative proposals.

The Transportation Conference recommends legislation repealing the present requirement on consolidations as to a comprehensive plan, balanced systems, maintenance of all possible competition and preservation of existing trade channels. The Conference recommends voluntary consolidations that will result in economies, assure adequate service and preserve reasonable competition. Other proposals approved would require more expeditious disposition of abondment proceedings before the Commission; disposal of the federal barge lines to private parties; relieve the railroads of the expense of the reconstruction of the railroad bridges in connection with navigation and flood control projects in excess of net direct benefits to them. The conference also recommended the repeal of the land grant rates; that the railroads should be relieved of the expense of grade crossing eliminations in excess of direct benefits; repeal of the undistributed profits tax; the avoidance of restrictive measures such as train-length limits; amendment of the railway labor act to include public members in odd numbers on adjustment boards. Action was not taken on the subject of rate making provisions or federal finance aid for the railroad, as these subjects will be considered later. This Conference was made up of a distinguished group of industrial and business leaders and included Joseph S. Young, president, Lehigh Portland Cement Co.

The National Industrial Traffic League is opposed to any legislation which has for its purpose interference with the administrative set-up and the general method of administering its jurisdiction or which would undertake to curtail seriously the discriminary power of the Commission. By a vote of 95 to 28 the league approved the committee report urging repeal of the long-and-short-haul clause of the fourth section. Opposition to proposed legislation limiting the practice of law before administrative bodies to attorneys-at-law was approved. Also approved was the proposal to give the Commission power to prescribe through routes regardless of participating carriers.

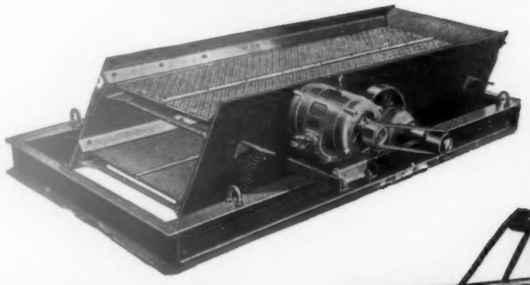
The Mississippi Valley Assn. is opposed to the repeal of the long-and-short-haul clause of section four; to the ratification of the St. Lawrence Seaway Treaty and to any legislation that would unnecessarily increase the cost of railroad operation. The association favors voluntary consolidation of railroads; limitation of land grant obligations; the repeal of section 15-A of the Interstate Commerce Act and relieving the railroads of obligations to stand the cost of altering railroad bridges which interfere with navigation. Opposition was voiced to the transfering of federal barge lines to private operation.

Chairman Lea of the House committee on Interstate and foreign commerce said that his committee would begin hearings on proposed transportation legislation shortly after congress convenes, and that hearings might be started in January.

NEW YEAR

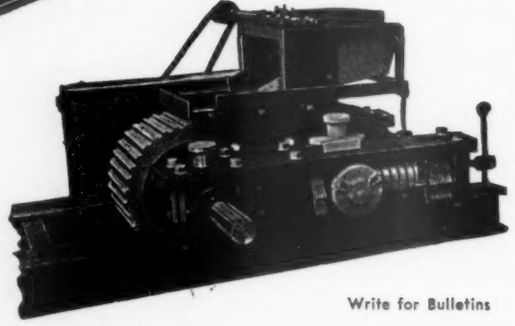
FOR ECONOMY Focus on "CIRCLE THROW"

NEW PROFITS



NEW HOLLAND VIBRATING SCREEN

Make your First Resolution to sift out the most "pay dirt" with a New Holland Vibrating Screen. The circle throw oscillating action affects the entire screening surface—"Every inch works for you." PUTS THROUGH more tonnage, with greater uniformity.



NEW HOLLAND ROLL CRUSHER

Equipped with powerful "cylinder jaws" that will grind their way through the toughest crushing job—and do it faster! New type pulsating feeder doubles capacity. Force feed action gives a rapid and continuous process. Finished product is of uniform grade, with a minimum of dust and undesirable fines.

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RECENT I. C. C. DECISIONS

Lime—The commission has denied the petition of Agent F. A. Leland for vacation of fourth section order No. 12,447 and modification of No. 12,480 covering lime to lower Mississippi river crossings in 218 I. C. C. 131 and 227 I. C. C. 409.

Sand and Gravel—Reparation of $59.40 with interest has been awarded on finding the rate on sand and gravel from Attica, Ind., to Champaign, Ill., unreasonable to the extent that defendant failed to provide for the absorption of $4.95 switching charge out of its line haul rate. I. C. C. docket No. 28,018, Neal Gravel Co. *v.* Wabash.

In an investigation on its own motion the commission has found that the rates on sand, gravel and certain other commodities within the state of Mississippi are in violation of section 13 of the interstate commerce act. This was brought about through failure of the Mississippi commission to permit increase in the intrastate rates to bring them up to the interstate level which the federal commission allowed in the Fifteen Per Cent. Case, 1937-1938. The report estimates a difference in revenue on the sand and gravel tonnage based on 1937 between the state and interstate scales of $450,000 annually. Prescribed rates on sand and gravel in 165 I. C. C. 731 plus 10 per cent. were prescribed in this case. The scale begins at 55 c. per ton for single line hauls and 65 c. per ton for joint line hauls for 10 mi. or less, and ends with a rate of $1.82 for both single and joint hauls for distances of 290 to 320 mi. Reasonable grouping may be maintained. Petitions seeking authority to meet truck or other competition must

comply with the Commission's rules of practice. I. C. C. docket No. 28,051, increase in Mississippi freight rates and charges. No. 27,790 Mississippi Sand & Gravel Assn. *v.* L. & N. *et all.*

NEW COMPLAINTS FILED

Cement—The commission has suspended from November 15 until February 13, certain schedules in supplement 5 to Agent W. M. Miller's M. F.—I. C. C. 121 proposing to reduce the mileage commodity rates on cement, minimum 20,000 lb. from Savannah, Georgia to points in South Carolina 160 to 360 mi. from Savannah, in lieu of present class rates. The proposed rates range from 14 c. per 100 lb. for 160 mi. to 20 c. per 100 lb. for 360 mi.

The Commission has suspended from November 23 to June 23 certain schedules in Southern Pacific Tariff I. C. C. 4,430 providing that the rates on cement and other articles in carloads from certain points in California and Oregon to Verdi and Mogul, Nev., will also include delivery to job-sites of construction work on U. S. Highway 40 in the vicinity of those destinations.

Sand—The commission has instituted an investigation on its own motion with respect to the lawfulness of intrastate rates on industrial sand in open-top cars from Polk and Utica, Pa., in I. C. C. docket No. 28,150, Industrial Sand within Western Pennsylvania.

Dempster Bros., Knoxville, Tenn., has appointed the following equipment dealers for its product, the Dempster Dumpster: Yancey Brothers, Inc., Atlanta, Ga.; Ajax Sales Co., Boston, Mass.; Choctaw Culvert & Machinery Co., Memphis, Tenn.; Hunter Tractor & Machinery Co., Milwaukee, Wis.; C. T. Johnson, 4358 Coolidge Ave., Minneapolis, Minn.; and W. H. Gelatt, 922 W. 30th St., Des Moines, Ia.

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Occupational Diseases and the Law

Partial Disability

Sec. 5(b) of the Pennsylvania Act of July 2, 1937, provides that compensation shall not be payable for partial disability due to silicosis, anthraco silicosis and asbestosis. The Common Pleas Court of Allegheny County, Pa., accordingly holds, in *Brown v. Pittsburgh Clay Pot Co.,* decided August 6, 1938 (86 Pittsburgh Legal Journal, 542), that when an employee brings a suit to recover for *partial* disability from silicosis, allegedly caused by negligence of the employer, what right the employee has to recover, if any, is not affected by the Act of July 2, 1937.

"Accident"

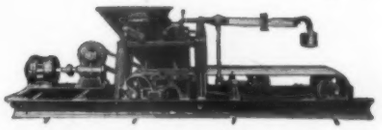
American Mutual Liability Insurance Co. v. Agricola Furnace Co., decided by the Alabama Supreme Court, October 6, 1938. This was a suit by an employer against an insurance company, to determine whether the insurance company was bound to defend a suit brought against the employer by an injured employee. In the latter suit an employee seeks to recover damages for injuries from silicosis and tuberculosis. It is alleged that silicosis and tuberculosis were contracted by reason of the unsafe condition of the place of employment, due to improper ventilation in such place and the circulation of particles of dust and metal in the air. The employee's suit is based on common-law rights and the Employer's Liability Act rather than on the Workmen's Compensation Act, which in Alabama does not cover this class of injuries.

The insurance contract covered only injuries sustained by reason of accidents, and has a rider specially disclaiming a coverage for liability on account of an occupational disease.

The court, following the cases of *Gentry v. Swann Chemical Co.,* 234 Ala., 313, 174 So., 530, and *Birmingham Electric Co. v. Meacham,* 234 Ala., 506, 175 So., 322, follows a strict construction of "occupational disease":

"An occupational disease is not an accident in either aspect of its meaning. But it is one which results from the ordinary and generally-known risks in-

MATERIAL weighted and proportioned with 99% Accuracy



Weighing and proportioning material with 99% accuracy, Schaffer Poidometers are recognized throughout the cement industry as important equipment in modern plant control.

Schaffer Poidometers are automatic in action and will operate continuously or, with a mechanical weighmaster attachment, will provide batch operation.

This efficient weighing equipment is now saving thousands of dollars throughout the cement industry. Many leading plants are now saving money while obtaining greater efficiency with Schaffer Poidometers. Let us help solve your proportioning and feeding problems. *Write for catalog No. 5.*

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Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

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The Model "135" LOADER

is the fastest loading machine within $5,000 of its price, as well as heaviest, strongest and most powerful Loader built. It competes with BIG equipment. On a cost-per-yard basis, it's all alone. *Bulletin 134*

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Who, for over 40 years, have created and sold none but equipment of demonstrable superiority in design and manufacture.

Portable Conveyors—Revolving Screens

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OIL RECLAIMER

Reconditions all types of contaminated oil to the full value of new oil. Removes *all* sludge, carbon, acid, fuel dilution and moisture, greatly reducing your lubricating costs.

The Hilco may be direct connected to stationary Diesel Engines for continuous purifying or used to reclaim oil drained from mobile equipment as Trucks, Tractors, Shovels, Compressors, etc. Fully Automatic—All Electric. Write us for interesting booklet "Oil Reclamation."

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cident to the particular employment and long continued work in it, as to which at common law the master owed the servant no duty, and it does not include one which results from the tort of the master in the failure to furnish the servant a proper place in which to work."

The court further holds: "When an act is continuous and all the time tortious and wrongful, it should not be exempted from . . . classification as an accident because it extends for a long period of time, however difficult it may be to separate the amount of damage done within the period of the statute of limitations from that occuring in the period preceding," citing *Lehigh Portland Cement Co. v. Donaldson,* 231 Ala., 242, 164 So., 97; *Howell v. City of Dotham,* 234 Ala., 158, 174 So., 624; *Lehigh Portland Cement Co. v. Higginbotham,* 232 Ala., 235, 167 So., 259.

Under the circumstances involved, the court holds (1) that the employee's complaint does not involve an "occupational disease," but an "accident caused by tort continuous in nature"; (2) that, consequently, the insurance company is bound by its contract to defend the suit for the employer.

Contracture

Soukop v. Friedman Marble & Slate Works et al., decided by the Appellate Division of the New York Supreme Court, Third Department, November 2, 1938; reported at 7 N.Y.S. (2d) 440. The court sustains the New York State Industrial Board in holding that "Dupuytren's contracture," an inability properly to extend or flex the fingers of the hand, as a result of the operation of an edge polishing machine which required tightening and loosening of a clamp by the constant turning of a knob or screw, was an occupational disease, and that permanent partial disability therefrom is compensable under the occupational-disease provisions of the Workman's Compensation Law. It is also held that the insurance carrier liable for payment of the award is the carrier at the time of the last employment in the operation concerned, rather than the carrier at the time the disablement was determined, which would be a blind and too strict construction of Sec. 38 of the Workmen's Compensation Law.

New Wage-Hour Book

How to Operate Under the Wage and Hour Law, *by Feller and Hurwitz, 248 pages, cloth bound, published by Alexander Publishing Co., Inc., New York, N. Y. Price $3.50.*

Employers confronted with the problem of complying with the provisions of the new law will find this book a clear and helpful source of information and guidance for use in making necessary adjustments as dictated by the new regulations. The book is written entirely from a layman's point of view and is in no sense a text-book or "treatise."

The text shows every evidence of careful preparation. By making clear the broad, underlying premises upon which the present legislation is based and which will probably influence the trend of future rulings, the book becomes decidedly useful as a background and foundation for forecasting the probable course of this far-reaching labor law. Business men will doubtless welcome this reliable help which will enable them to plan administrative policy in the light of the law's interpretation and effect. As an answer to this need as well as a factual study of the law itself, one may well recommend this book for the attention of those who would know the inner workings of this latest, and most significant, experiment in the field of industrial control.

The Osborn Manufacturing Co., Cleveland, O., well-known throughout industry for their complete line of brushes and molding machines, recently purchased the assets of the Johns Conveyor Corp. of Newark, N. J., and obtained the exclusive patent rights to manufacture and sell this conveyor in the United States and its possessions.

This conveying device consists essentially of a rubber tube formed of two separate halves *(P & Q, April, 1937).* Solid materials in powdered, crushed or broken form are handled with freedom from dust or spilling. The material being conveyed is held within the closed halves of the tube, which in the form of an endless belt, is moved over pulleys.

Manufacturing operations are now being moved to Cleveland, Ohio. Harry S. Johns, the inventor, will be chief engineer of the Johns Conveyor Division of the Osborn Manufacturing Co.

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PROFITABLE NEW PRODUCTS

JAEGER ALONE Builds This MODERN TRUCK MIXER....

1. SYPHO-METER WATER TANK

Accurate within a fractional per cent of tank capacity regardless of tank position or splash-lag on roughest roads — a 1939 improvement.

2. DUAL REVOLVING WATER SPRAYS

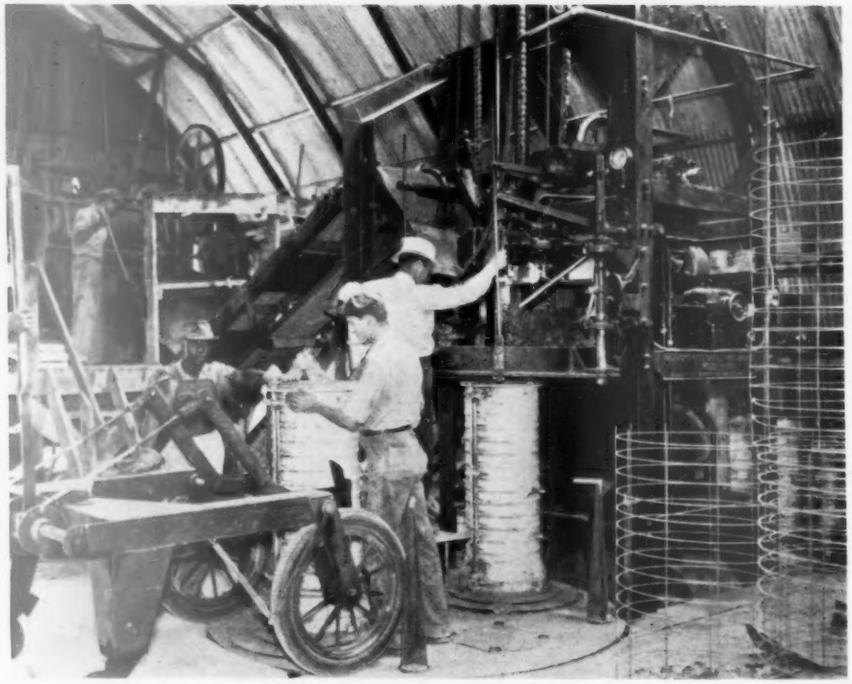
100% faster, uniform water distribution — clear path as they revolve, spray into and over mass in both directions, from end to end of drum — insure thoro mix even on shortest hauls — a 1939 improvement.

3. MORE SALABLE CONCRETE

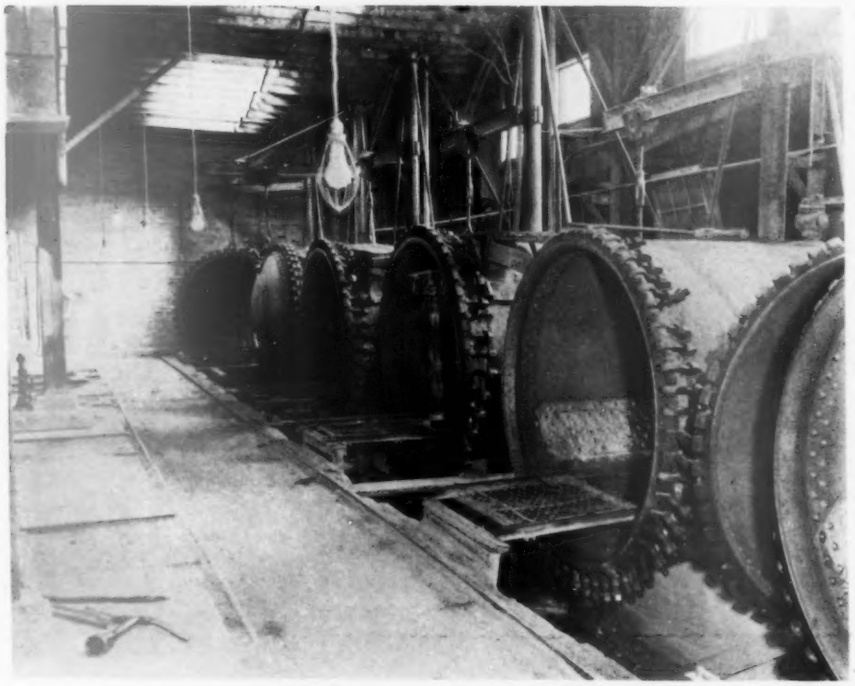
Jaeger Reversing End-to-End Mix, plus accurate measurement and more rapid and uniform distribution of water, produce recognized higher strength concrete, give Jaeger operators a basic sales advantage. Bulletin TM-39 gives up-to-the-minute information. Send for your copy!

THE JAEGER MACHINE CO.
602 Dublin Ave. Columbus, Ohio

Plant Improvements Reflect Gains Made by Concrete-Units Industry



Concrete pipe being made in the new plant of the Louisiana Materials Co., New Orleans, La., a leading producer of aggregates. These pipes require no pallets in the curing room and are stripped immediately.



The six high-pressure curing kilns in the plant of the Michigan Pressed Brick Co., Detroit, Mich. These are used to cure sand-lime bricks and concrete blocks. Also illustrated is the track system serving these kilns.

FROM all indications, 1939 should be a banner year for concrete units, continuing the upward swing which has been evident during the last few months. Demand was at a high level even during the early months of the year when general business was at a comparatively low ebb. This condition was due to the large volume of private building construction and the growing preference for this type of building material. The effect of new products such as joists, beams, etc., is also beginning to make itself felt and promises to become an important factor. Improved methods of manufacture, making possible a better product, were also a contributory factor.

The demand for concrete pipe is also increasing and should continue to do so judging from the large number of sewage, irrigation and drainage projects contemplated for 1939.

The advantages of combining concrete units manufacture and commercial aggregates production become increasingly evident as more and more aggregates producers enter this field. Many of these plants are operated as branches of an aggregate concern, others are operated as subsidiaries or under separate incorporations. Under any of these systems the same advantages obtain. Similar sales objectives and the elimination of an intermediate profit on the aggregates used alone justify such combinations.

The use of high-pressure steam kilns to cure concrete blocks was not new in 1938, but was adopted by a number of companies during the year. The Michigan Pressed Brick Co., Detroit, Mich., had made sand-lime bricks and blocks for years, curing them in steam kilns. In the summer of 1938 a Besser automatic stripper was installed. The blocks are loaded on cars and run into the kilns. Curing at 350 deg. F. under 120 lb. steam pressure gives these blocks a strength of 2000 lb. per in. in 8 hours. These blocks are also subject to less volume change than those cured in the usual manner. They can be shipped as soon as they are taken out of the kilns. An article describing the improvements was published in the September, 1938 issue of PIT AND QUARRY.

The La Porte Cement Products Corp.,

La Porte, Ind., early in 1938 put into operation a plant for the production of Dunbrik and concrete block. In addition to the block machine, the W. E. Dunn Manufacturing Co. supplied the skip and mixer. Two used power tampers were also installed. A description of this new plant was published in the October, 1938 issue of PIT AND QUARRY.

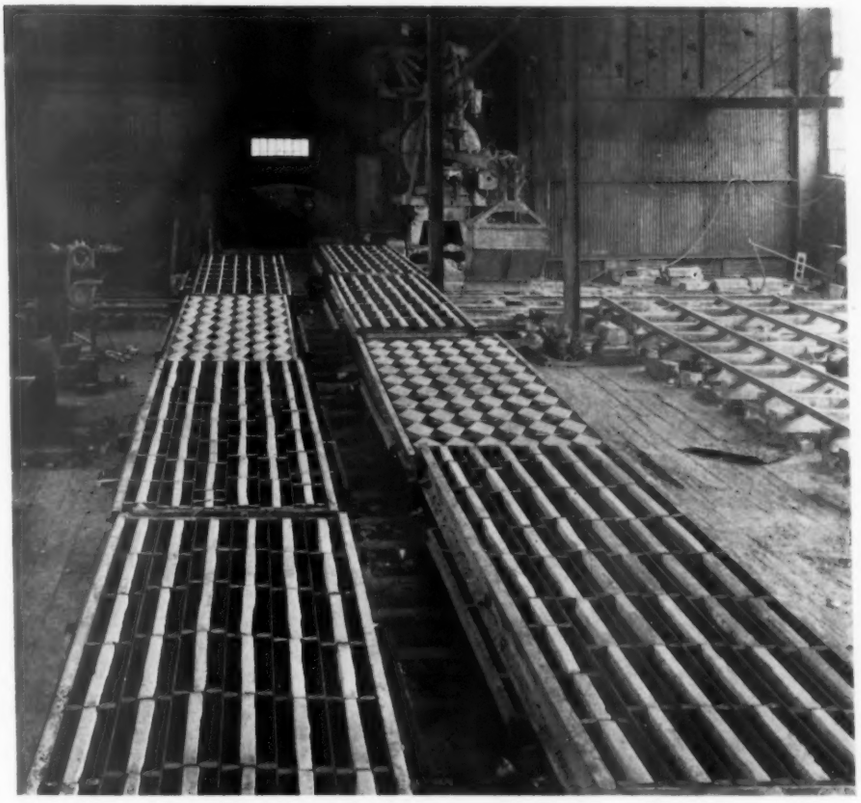
Another new 1938 plant is that of the Interlachen Concrete Tile Co., Interlachen, Fla., which was described in the November, 1938 issue of PIT AND QUARRY. This company is a subsidiary of the Diamond Interlachen Sand Co. and is located near that company's gravel plant. Four Maddox hand-tamp block machines are used.

Milcarek Brothers, Michigan City, Ind., had manufactured blocks on hand-operated machines for many years, but in the summer of 1938 installed power machines to keep up with the demand. A Blystone shovel-type mixer and a Miles No. 4 power tamper were installed. A description of their operation was published in the November, 1938 issue of PIT AND QUARRY.

The Instone Co., Hammond, Ind., developed a product which is gaining in favor. Known as Instone, or Macstone, this product consists of thin slabs of Briar Hill sandstone of various shades backed up with light-weight concrete. It combines the beauty of the natural stone with a cost comparable to that of standard face brick. Equipment consists essentially of a concrete mixer, a vibrating table and a machine for splitting the stone. This plant was described in the July, 1938 issue of PIT AND QUARRY.

The Pyramid Gypsum Co. of Salt Lake City, Utah, built a cinder-concrete brick plant at Jerome, Utah, and may build another at Pocatello, Idaho. The Cemstone Products Co., Inc., St. Paul, Minn., installed a Besser automatic power stripper. W. H. Friedrich & Co., Coldwater, Mich., bought a Stearns stripper block machine. Block & Brick, Inc., Detroit, Mich., installed an 80-ft. Jackson & Church steam hardening cylinder. Chris Abraham, Capac, Mich., bought a Stearns stripper. The City Transfer Co., Casa Grande, Ariz., installed a Graystone brick, block and tile machine. Concrete Products, Inc., of Marion, O., built a new plant for the manufacture of precast concrete units.

Dunbrik machines have been installed, by the Builders' Supply Co. Galesburg, Ill., the Nu-Carth Brick & Stone Co., Carthage, Mo., the Sand Mountain Sand Corp., Wytheville, Va., the Quartzite Stone Co., Lincoln, Kan., and the Dunbrik Manufacturing Co., Bowling Green, Ky. The City Fuel & Supply Co., Milwaukee, Wis., installed a steam-curing plant and other equip-



Forms with sandstone slabs in position ready to be filled with concrete at the plant of the Instone Co., Hammond, Ind.

The new concrete-pipe plant of the Houston Concrete Pipe Co., Houston, Tex.

Operations of the Interlachen Concrete Tile Co., at Interlachen, Fla., with part of the storage yard. The block plant and aggregate-loading plant are in the background.

ment for the manufacture of concrete units including Waylite blocks. The McCorkle Stone Co., Milroy, Ind., installed a Dunbrik plant. The Concrete Products & Material Co., Omaha, Neb., installed a concrete block machine. The Chillicothe Gravel Co., Peoria, Ill., added a block machine. The Winchester Brick Co., Winchester, Mass., bought two 15-ton trailer trucks and is contemplating changes in its sand-and-gravel operations.

Among the many new manufacturers of concrete blocks are the following:

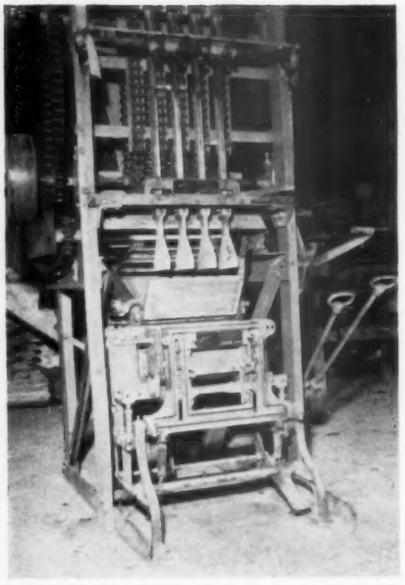
Nohl & Schmidgall, Morton, Ill.; Des Moines Concrete Products Co., Des Moines, Ia.; S. R. Russell, Bowling Green, Ky.; D. M. Lundell, Red Wing, Minn.; Makins Sand & Gravel Co., Oklahoma Ctiy, Okla.; Thomas Concrete Pipe Co., Ada, Okla.; Virginia Cinder Block Co., Narrows, Va.;

The new shovel-type mixer used in the plant of Milcarek Bros., Michigan City, Ind.

Jaeckle's Concrete Products, Okauchee, Wis.; Bor Cement Products Co., Hollywood, Fla.; Bay Concrete Co., Port St. Joe, Fla.

The Grove Stone & Sand Co., Grovestone, N. C., built a new Dunbrik plant on the same property with its new sand-and-gravel plant. A new block plant was built by the Hawcreek Block Co., Columbus, Ind. The Eastwood Sand & Gravel Co., Grayville, Ill., is now manufacturing plain and glazed Dunbrik. Equipment for making Dunbrik was also installed by the Gravel Products Corp., at Tonawanda, N. Y. A complete description of this operation appears elsewhere in this issue.

The Kentucky Concrete Products Co., a unit of the Marietta Concrete Products Co., Marietta, O., built a new plant at Shelbyville, Ky. The Superior Brick Corp., St. Louis Park, Minn., installed an automatic Besser power stripper and Besser mixer; the Bennet Concrete Stone Co., Cleveland, O., installed a Besser automatic power stripper, and the North Girard Concrete Works, North Girard, Pa., installed an Anchor stripper. The Clingbuilt Con-



Power tamper recently installed in the plant of Milcarek Bros., Michigan City, Ind.

crete Products & Septic Tank Co., Seattle, Wash., also added new equipment. The McDonald Concrete Construction Co., built a new plant at Brunswick, Ga., to produce concrete blocks and other products.

Among the many companies contemplating the erection of new concrete-units plants were the Atlas Concrete Block Corp., Columbus, Ohio; the Mortarless Concrete Block Co., Palm Springs, Cal.; the Cinder Insulation Block Co., Nampa, Idaho; Julian C. Field Co., Denison, Tex.; Lee C. Swartz, Grand Coulee, Wash.; Bert A. Leitzen, Rochester, Minn.; the Atlas Building Material Corp., East St. Louis, Ill., and M. Kammerer & Sons, El Paso, Ill.

The concrete brick machine in the plant of the La Porte Cement Products Corp., La Porte, Ind.

The Gifford-Hill Pipe Co., Dallas, Texas, has operated a pipe plant near the Grand Prairie, Tex., sand-and-gravel plant of Gifford-Hill & Co., since 1931. This company also fills large contracts for pipe in the Southwest, with portable plants set up near the jobs. Such a plant was put in operation in November, 1938 at Brownsville, Tex., to fill an order for 40,000 ft. of 24- to 36-in. re-inforced concrete pressure pipe. This plant is operated in association with the Concrete Conduit Co., which owns a patented machine for the manufacture of "Centrifugal-Spun" pipe. The company has also just completed a permanent new plant at Albuquerque, New Mexico. A Quinn machine is used to make pipe up to 72 in. in diameter and a tamp machine is used for smaller pipe.

The Louisiana Materials Co., New Orleans, La., a leading producer of sand, gravel and shell, early in 1938 began operating a new plant making sewer pipe and fittings from 6 to 36 in. in size. A Besser 1-cu. yd. skip and mixer assembly feed the Concrete Pipe Machinery Co., McCracken Model "H" dual packer-head pipe machine. No pallets are used in storing this pipe and the molds are opened immediately.

A new pipe plant was also put into operation by the Houston Concrete Pipe Co., Houston, Tex. A Prestley packer head machine is used to make 4-, 6- and 8-in. pipe and fittings in 2½-ft. lengths—larges sizes up to 15 in. are made by hand in Quinn forms; bridge and highway culverts up to 24 in. are also made. A semi-dry concrete is used and forms are stripped immediately.

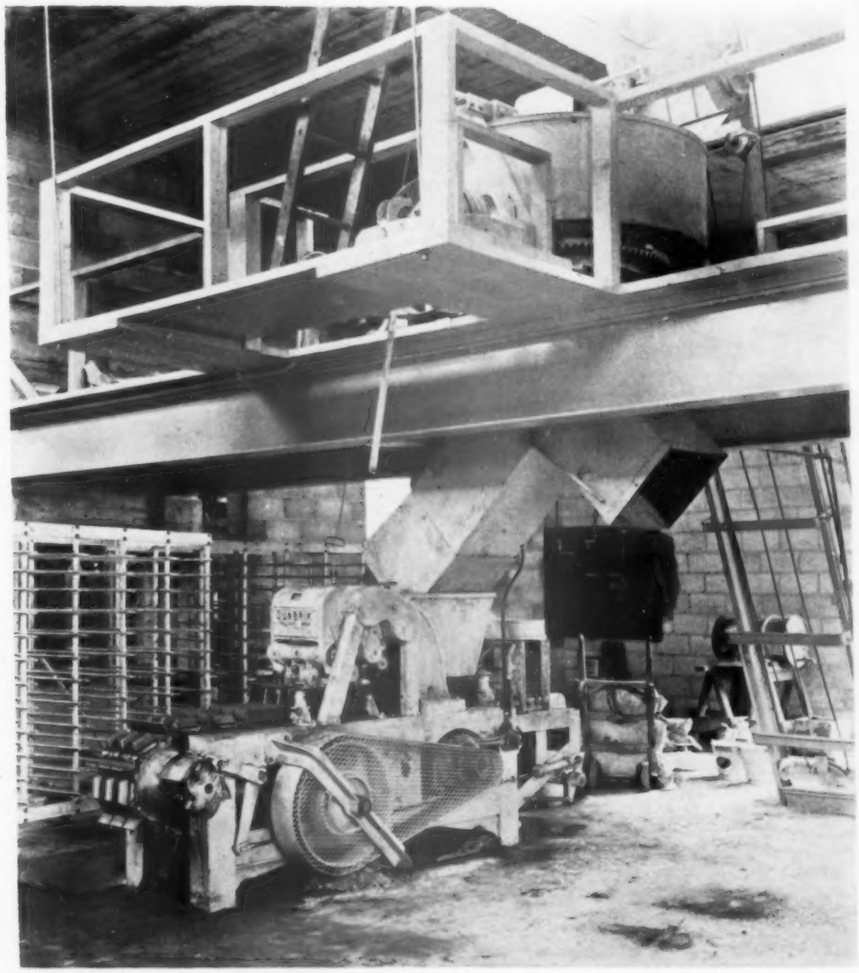
The Peerless Concrete Pipe Corp., Orange,, Cal., built a pipe plant using a Snow air-tamping machine. The Ontario Concrete Pipe Co., built a new plant, doubling its former capacity. The Universal Concrete Pipe Co., bought the Yancey Concrete Products Co., and erected a pipe plant. The Kauai Terminal, Ltd., Hawaii, built a plant to make concrete tile with volcanic cinder aggregates. The Miller Concrete Products Mfg. Co., Chattanooga, Tenn., started the construction of a plant to make concrete building units, pipe, etc. The Lock Joint Concrete Pipe Co. had under construction at Emporia, Kan., a new plant to manufacture concrete pipe, block and silos.

New pipe machines made by the Concrete Pipe Machinery Co. were installed by the Nelsen Concrete Culvert Co., St. Louis, Mo., and the Wallace Concrete Pipe Co., Columbia, S. C. The Jackson Concrete Pipe Co., Jackson, Mich., built a new pipe plant with steam-curing kilns. The Sherman Concrete Pipe Co., Birmingham, Ala., built a new plant for

(Continued on page 126)

LAUNCHES NEW CONCRETE-BRICK PLANT

New addition to the Tonawanda plant of the Gravel Products Corp. which houses the brick-making equipment.



Brick machine with skip and mixer above. Note the heavy steel beams and provision for feeding another machine.

THE Gravel Products Corp. of Buffalo, N. Y., has made the headlines many times in the past with its sand-and-gravel and ready-mixed-concrete operations. Long a leading producer of these materials the company in 1937 took the logical step of adding concrete pipe to its products. The new plant at Tonawanda, 9 mi. north of Buffalo, was described in the November, 1937, issue of PIT AND QUARRY.

This new product met with such ready acceptance that the company next began the manufacture of "Permacrete"

Cores and end-forms are a part of the conveyor which carries the molded bricks away from the machine.

concrete crypts. These are made with a vibrating table and forms furnished by Permanent Concrete Products, Inc., which owns the patents on this product. These crypts are made in 6 sizes. The vibrating table is also used in the manufacture of miscellaneous specialties. A drum mixer supplies the concrete in this department.

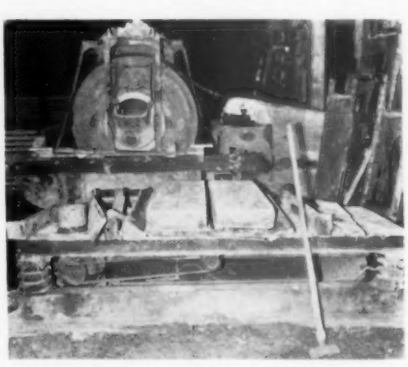
The company recently completed an addition to its products plant for the manufacture of Dunbrik concrete bricks and Dunstone. The addition consists of a 100-ft. by 52-ft. structure built of concrete blocks and connected to the original plant. This addition consists of a large room in which the equipment is housed and four 8-ft. by 42-ft. curing rooms. The main room is of unusual

Workmen transferring the bricks from the racks to outdoor storage.

Reinforcing cages for pipe are formed and welded electrically.

design and has no piers or columns to be in the way. The mixer platform is on two 16-in. steel I-beams 34 ft. long, which are supported at their ends on concrete piers. Space has been left for a second brick machine and a roof-tile machine. This new department went into operation on October 5, 1938, and was formally opened on October 15. About 250 architects, contractors and other invited guests attended the opening and were served a dinner at a local hotel followed by a demonstration of the equipment.

Aggregates are now fed by wheelbarrow to the skip bucket feeding the Dunbrik machine, but a hopper is to be installed for gravity feed. Cement is dumped into the skip bucket from sacks. The skip bucket discharges the ingredients into the mixer, which serves the brick machine. All this equipment is of standard design. A crew of seven men operates this department. Four men work in the plant making the bricks and transferring them into the curing rooms and three men transfer the cured bricks to outdoor storage and load them for shipment.



Vibrating table and mixer used in the manufacture of crypts.

The daily production is about 15,000 units. The finished bricks are transferred from the machine to steel racks. Dunn lift trucks are used to haul the racks into the curing rooms. There they are steam- and spray-cured for 24 hours before they are transferred on the same trucks to outdoor storage piles. They are then sprayed for 7 days and after 7 more days are ready for use.

Crane loading pipe into truck for delivery.

Most of the product will be used in home and building construction. Products include ashlar bricks, solid color bricks, sewer bricks, glazed-face bricks. The Dunstone is also made in any desired sizes up to three bricks long and two bricks wide. A Colorcrete, Mat-Glaze machine is used for coloring these products. A choice of over forty variegated tones and textures is available.

Concrete Units *(from page 124)*

the manufacture of plain and re-inforced concrete pipe. New pipe plants were also built by J. R. Brewer and L. Hopper, Mountain View, Ark., and the Woodlake Concrete Products Co., Woodlake, Cal.

The new concrete products plant of the Cummer Lime & Mfg. Co. at Kendrick, Fla., is operated in connection with new lime and crushed-rock plants. Sized rock is conveyed from the crushing plant to a bin. Equipment includes mixers and a compacting machine for making the blocks. Curing is done in six air-tight rooms in approximately 100 per cent. humidity. The blocks are pure white, can be cut and carved, are chemically compatible with mortar and are said to be 20 per cent. lighter than sand concrete blocks.

Concrete-Brick Industry Consumes Millions of Yards of Aggregates

THE constantly increasing activity in the building industry is opening the door to aggregates and cement producers for a large volume of business in a new market that a few years ago was almost negligible, but in a short space of time has grown to be the consumer of millions of cubic yards of aggregates during 1938.

This new market is the development of the cement-brick industry, which makes a product that but a short time ago was almost obscure, was used and made only in a few isolated localities, but recent improvements in the product and in the design, processes and equipment employed in its manufacture are fast bringing it to the front as one of the basic commodities in the masonry building-material market.

Its acceptance has been almost phenomenal. In some localities it already dominates the masonry-material market. It has the fundamentals that should place its manufacturers among the largest consumers of the products of the aggregates and cement industries.

Analyzing its potentialities in the order of their importance, there is first a product of high quality, one that is long-lived, vermin-proof and fire-safe by the nature of its components. New developments make it possible to produce it in colors and textures that meet critical demands. As a matter of fact, in some of today's ultra-modern architectural designs it is possible to obtain brilliant color combinations.

Combined with quality, the next big feature is, naturally, price. The raw materials of which cement brick is made are low in cost, available almost anywhere in this country. There is available for its manufacture equipment that requires little capital investment and no more than its local market to give profitable operation. It creates a new decentralized industry that will have far-reaching economic effects by eliminating the transportation cost on finished products through direct factory-to-job delivery. This cost reduction in itself is constantly widening the market as the buying public is naturally eager to build of masonry provided the cost is within reach.

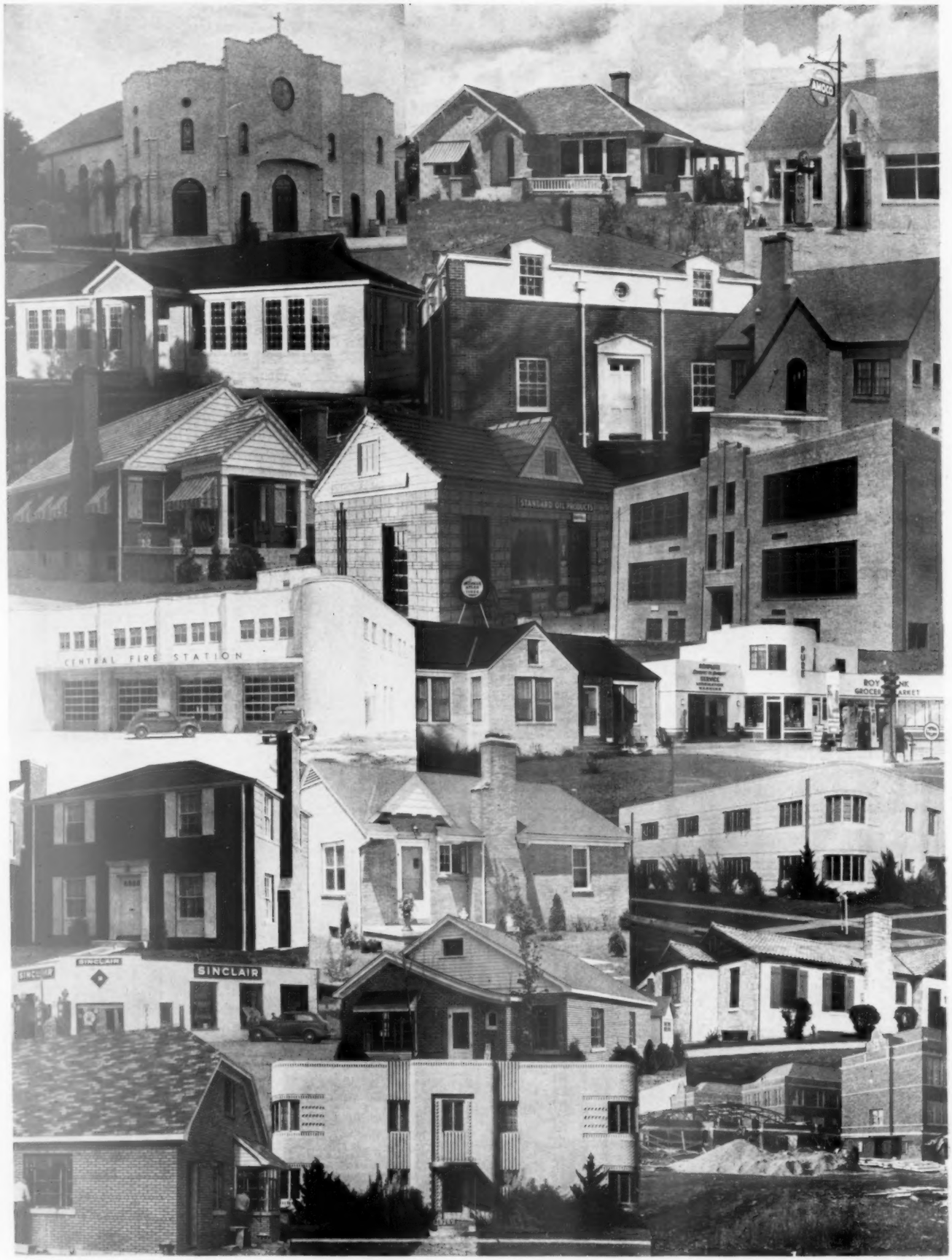
So it is not difficult to foresee the aggregate industry playing an important part in controlling the masonry building-material market. This is the largest new market open to this industry, as 1,000 bricks represent 1.4 cu.yd. of aggregate. A recent survey based on reports from representative plants showed a consumption of over 224,000 cu.yd. of aggregate in the making of cement brick in the last year. Yet that represents only a fraction of the total volume of bricks used in this country, even at the present depressed rate of construction. Now with the rise of construction and the constant demand for more lasting building it is easy to foresee concrete-brick becoming one of the aggregates producer's largest profitable outlets.

Cement brick has been used in United States government, state and municipal projects. Its use in industrial construction includes the names of Du Pont, General Motors, Chain-Belt, Champion Spark Plug, etc. Among its producers in the aggregates industry are such concerns as the Consolidated Quarries Corp., Rockledge Products, Bayer-Brice Co., McDonald Corp., New London Sand & Gravel Co., Gravel Products Corp., Eastwood Sand & Gravel Co., Riverside Sand & Gravel Co., and others.

Cement brick is made on a continuous-line production machine to a large extent to-day. The strength of brick taken from stock has been demonstrated by numerous authoritative tests of the products of widely separated operating plants and many of these show crushing strengths well over 3,500 lb. per sq. in. and absorption as low as 5 per cent. With cement brick the natural affinity of mortar also tends to produce a stronger wall or structure.

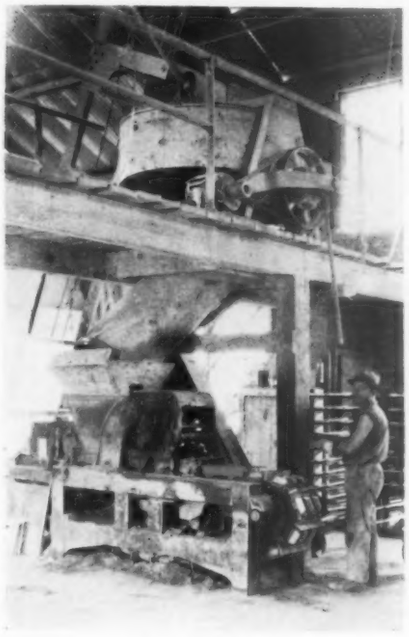
To encourage a wider use of masonry construction equipment has been made available for the manufacture of multiple-size bricks. These units are exact multiples of the standard-size brick plus the standard ½-in. mortar joint. This feature offers the architect and contractor quality masonry material with almost limitless possibilities for improved structural design either in combination with standard-size bricks or in combinations of larger sizes. In some locali-

Concrete bricks in storage yard at an aggregate-producer's plant.



An example of the immensity of the market for aggregates that is being created by the development of the cement-brick industry. The few recently constructed cement-brick buildings shown consumed over 28,000 cu. yd. of aggregate in above-grade construction.

ties these new sizes are being used in all masonry hollow-insulated construction and are reducing the cost of permanent fire-safe masonry building to the level of good frame.



Production equipment for the manufacture of concrete bricks.

Probably the largest single factor in advancing the popularity of cement brick, outside its quality and cost, has been the development of processes of producing these units in a full range of colors, affording the possibility of one manufacturer serving the complete face and back-up market with cement brick. In this phase there are two methods in use. One consists of using a specially-prepared integral color combination, which is added to the mixture when making brick. The second and more flexible method is a process of pneumatically spraying the material that is mixed to a plastic mass about the consistency of mortar. From the manufacturer's standpoint the most attractive phase of this process is that it does not require carrying of a large inventory of face brick. The purchaser selects from the manufacturer's samples, and common bricks are converted into face units ready for delivery in but a few day's time in any color that the customer may choose. This process has done much to help gain the general acceptance of cement brick by the building trades as it offers great possibilities in carrying out to-day's vogue of modern design which depends greatly on distinctive combinations of color as part of the architectural design. These advancements brought about in the past few years in the manufacturing methods of cement brick coupled with the constantly growing demand by the public for more permanent, fire-safe construction at low cost provide conditions that offer the aggregate and cement industries an opportunity to enter a new large-volume market, that was almost closed to them a few years ago.

Survey of Phosphate Resources Continues

Agricultural regions are showing wide interest in a survey of phosphate resources by a special congressional committee, according to Senator Pope, of Idaho, committee chairman.

Speaking at Washington before the committee went to Sheffield, Ala., on Nov. 21 to survey a special fertilizer plant and process developed by the Tennessee Valley Authority, he said, "the committee is especially interested in the production of triple-phosphate by the electric process developed at T.V.A."

The committee has held hearings at Washington and Pocatello, Idaho, and planned to go to Florida after the T.V.A. session. Pope, although defeated for re-election, will continue as committee chairman.

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Pre-Mixed Concrete and Lime-Putty Made Definite Progress Last Year

THE growth of the ready-mixed-concrete industry continued at an undiminished rate during 1938, and the productive capacity reached an all-time high point. New operators entered the field by the dozens and many established producers increased their capacity by the purchase of additional truck-mixers or agitators, or by the establishment of additional batching plants. All indications point to a continued increase in business during 1939 and, barring unforeseen developments, a new level of production should be reached by the industry.

In 1938, as in previous years, building codes were brought up-to-date and specifications were tightened, making it necessary for many producers to modernize their batching plants in order to hold their business. The dump trucks and volume batchers once so common in this industry have become practically extinct. The batching of cement by weight prevails, but many producers, especially in the smaller cities and towns, prefer the hand-and-sack system. There is a growing appreciation by the industry of the advantages of producing concrete on a strength basis and producers in certain territories have been very successful in selling these advantages to the consumers.

An outstanding development of the year was the adoption by the Koenig Coal & Supply Co., Detroit, Mich., of the Scientific Concrete Service Corporation's precision-control method of concrete manufacture. This system is used in the three plants operated in Detroit by this company. The system and plants were described in detail in the December, 1938, issue of PIT AND QUARRY. This system makes possible the production of concrete of predetermined strength through the accurate control of all its ingredients. Special scales and control equipment make this possible.

The precision-control equipment consists primarily of two Toledo scales, one for moisture determination, the other for batch weighing and moisture compensation. Moisture-determination tests of the aggregates are made hourly and the results are used in weighing the batches. In the weighing process the scale automatically compensates for the moisture in the aggregates.

The Arundel-Brooks Concrete Corp., which set a new standard for the industry in 1931 with its Wolfe St. Plant in Baltimore, Md., in May, 1938, put in

The new yard of Jahncke Service, Inc., New Orleans, La., with lime-putty and ready-mixed-concrete plants in background.

A 2-cu.-yd. truck-mixer which was purchased by the Ready-Mixed Concrete Co., Pocatello, Idaho, a new producer.

The office and main concrete-batching plant of the Anderson-Dunham Co., Baton Rouge, La., a new producer.

The new batching plant of the John T. Dyer Quarry Co. at Pottstown, Pa.

The new lime-putty plant of the Pennsylvania Supply Co., Harrisburg, Pa.

operation a third plant at Woodberry, a suburb of that city. This plant, like the others, is a central-mixing operation, as the company is a firm believer in the advantages of plant-mixed concrete. The equipment includes Blaw-Knox bins and batchers and a Chain-Belt plant mixer. The company now operates a fleet of 36 Chain Belt Rex 4- and 5-cu. yd. truck-mixers used as agitators, five of which were bought this year. Mack and Autocar trucks are used. In May, 1938, the company installed a Cummins Diesel engine in one of its trucks with such gratifying results that it has ordered additional units.

The new central-mixing plant of the Arundel-Brooks Concrete Corp., Baltimore, Md.

The Arrow Sand & Gravel Co., Columbus, O., put in operation a temporary plant to supply concrete for a 1,200-apartment Federal housing project in that city. Concrete was supplied for the buildings and for streets and side-walks for this development. A maximum of 400 cu. yd. of concrete daily has been produced at this plant without taxing its capacity. Batched aggregates are hauled to this plant in dump trucks, making it necessary to haul the concrete only a short distance. As the company's main plant is 6 mi. away, this requires fewer truck-mixers than if deliveries for this project were made from the main plant. As a result the company has been able to serve this project without neglecting its regular customers.

A new plant devoid of any frills was put in operation in May, 1938, by the Sparling Ready-Mixed Concrete Corp., Fort Wayne, Ind. As this plant is located beside a high railroad fill sacked cement is brought to the batching floor by gravity. Portable conveyors feed aggregates into the bins. Butler bins and weighing batchers are used. The original fleet consisted of 4 Chain Belt 1½-cu. yd. truck-mixers, and two 2½-cu. yd. mixers were added in July. The company also operates a portable batching plant to supply concrete for large construction projects in and near the city. A more complete description of this plant is published elsewhere in this issue.

The Anderson-Dunham Co., Baton Rouge, La., in January, 1938, put in operation a new plant with Butler bins and weighing batchers and a fleet of 8 Chain Belt 1½-cu. yd. truck-mixers. Three more mixers were purchased in November. All are mounted on Ford chassis. In order to serve another section of the city better, the company recently installed another batching plant. A used Chain Belt 27C paver has also been purchased.

The John T. Dyer Quarry Co., an old-established crushed-stone producer, in April, 1938, put in operation a new batching plant in Pottstown Pa. Blaw-Knox bins and batchers and Winslow scales are used. Concrete is delivered in two Blaw-Knox 3-cu. yd. mixers mounted on Ford V8 trucks. This plant was completed just in time to dry-batch materials for a highway contract.

A small new plant was built by the H. O. Seiffert Co. at Everett, Wash. All the materials are handled by gravity. A Butler aggregate-weighing batcher and Fairbanks dial scale are used. Deliveries are made in two Chain Belt 1½-cu. yd. truck-mixers. This operation was described in the July, 1938, issue of PIT AND QUARRY.

The H. E. Casey Co., San Mateo, Cal., recently put in operation a second ready-mixed-concrete plant to serve the San Mateo-Burlingame area. The Roanoke Ready Mix Corp., Roanoke, Va., installed a Blaw-Knox batching plant. The Billiter Co., Newport, Ky., also erected a new plant, using a Fuller-Kinyon portable unloader for handling bulk cement.

Many other new plants were built in the past year by newcomers in this industry or by established producers

The new gravity batching plant of the H. O. Seiffert Co., Everett, Wash.

who wished to improve or expand their operations. Roy Sablain, a sand-and-gravel producer of Lansing, Mich., put in Butler bins and batchers and a fleet of 10 truck-mixers. All the handling of materials is done by gravity in this plant. The Carl Glesing Co., Indianapolis, Ind., concrete-block manufacturer, began the production of concrete with 2 Lee transit-mixers. The Dauphinais Sand & Gravel Co., North Grafton, Mass., built a Butler plant with 2 Chain Belt 2½-cu. yd. truck-mixers mounted on Autocar chassis. The Transit Mixed Concrete Corp., Logansport, Ind., built a modern steel-and-concrete batching plant and uses 4 Chain Belt 1½-cu. yd. truck-mixers.

The Maloney Concrete Corp. added another plant with Butler bins and batchers. This company operates 75 truck-mixers, mostly Jaeger. George Robinson, Alexandria, Va., built a new plant and purchased Blaw-Knox truck-mixers. A new Blaw-Knox plant was erected by J. A. Eck & Sons, Montoursville, Pa. The Service Concrete Co.,

New ready-mixed-concrete plant of the Billiter Co., Newport, Ky., which went into operation in March.

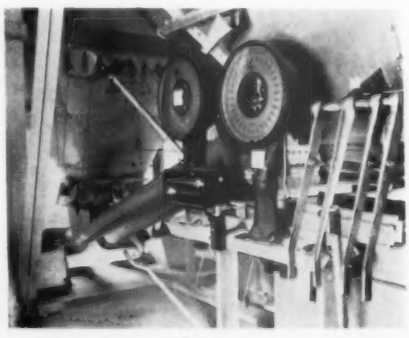
Muncie, Ind., built a new plant and bought 3 Blaw-Knox mixers mounted on Ford trucks. A branch plant was built at Ironton, O., by Portsmouth Mixed Concrete, Inc., of Portsmouth, O. The General Materials Co., St. Petersburg, Fla., put in operation a new plant and 2 Concrete Transport truck-mixers. The Independent Sand & Gravel Co., Cincinnati, O., entered the field with several Lee transit-mixers. New plants were also put in operation by: the Central Sand, Gravel & Supply Co., Wauwatosa, Wis.; the Jackson Pike Sand & Gravel Co., Columbus, O.; the Kokomo Ready Mixed Concrete Corp., Kokomo, Ind.; the Vinita Ready-Mix Concrete Co., Vinita, Okla.; and the Transit Mix Concrete Co., Owensboro, Ky.

A few of the many established ready-mixed-concrete producers who added to their fleets of truck-mixers or agitators in the past year follow. The Kansas

One of the mixer trucks being loaded at Plant No. 1 of the Koenig Coal & Supply Co., Detroit, Mich.

Sand Co., Topeka, Kan., added 5 Chain Belt mixers mounted on International trucks. The Concrete Supply Co., Evansville, Ind., added 2 truck-mixers, making a fleet of 11, and also built a new 300-ton aggregate bin. The L'Oiseaux Builders' Supply Co., Elizabeth, N. J., bought 3 Blaw-Knox 3½-cu. yd. mixers. The Union Sand & Supply Corp., Painesville, O., added a third truck-mixer. The Rosenfeld Washed Sand & Stone Co., Milford, Mass., added a 1½-cu. yd. Ransome truck-mixer. The Ready-Mixed Concrete Co., Honolulu, Hawaii, added 4 truck-mixers of 2½-cu. yd. capacity, making a fleet of 16, and reports rapidly-growing business. The Super Concrete Corp., Washington, D. C., added some 4-cu. yd. Blaw-Knox truck-mixers to its fleet, which is one of the largest in existence. A 2-cu. yd. Smith-Mobile was purchased by the Ready-Mixed Concrete Co., Pocatello, Idaho.

The Valley Ready Mixed Concrete Co. has a new plant under construction at Grand Chute, near Appleton, Wis. The Roling Concrete Co., Ada, Okla., expanded its operations during the year.



A view of the batching floor in the new Arundel-Brooks plant.

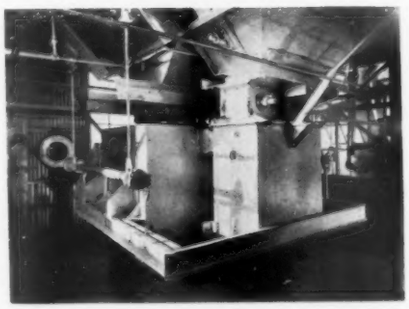
The Colonial Concrete Co., West Orange, N. J., added a Kron dial scale, Jaeger water tank, Erie cement hopper, two Jaeger and two Ransome 3½-cu. yd. truck-mixers and five autocar trucks. The Ready Mixed Concrete Co., Denver, Colo., purchased a Blaw-Knox batching plant.

Among the many companies reported planning to enter the ready-mixed-concrete industry during the year were the Victory Sand & Stone Co., Topeka, Kan.; the Acme Sand & Gravel Co.,

The temporary batching plant with which the Arrow Sand & Gravel Co. supplied a Federal Housing project.

Somerville, Mass.; Albert von Unwreth, Muskogee, Okla.; the Western Lime Products Co., Ogden, Utah; the McMichael Concrete Co., Lubbock, Texas. The Central Pre-Mix Concrete Co., Spokane, Wash., expects to install bulk-cement handling equipment.

Wm. H. Brant & Sons, West View,



Batching and control equipment in one of the Koenig plants.

Pa., bought two truck-mixers. Beckus Building Supplies, Tamaqua, Pa., bought a 2½-cu. yd. Chain Belt truck-mixer. The Concrete Construction & Supply Co., Columbia, S. C., added a Jaeger truck-mixer to its fleet.

Graham Bros., Inc., Los Angeles, Cal., built a new concrete-batching plant with a capacity of 120 cu. yd. per hour. The Crowe Lime & Cement Co., Amarillo, Tex., added two Chain Belt 2½-cu. yd. truck-mixers. John S. Hodgson & Co., Montgomery, Ala., bought a truck-mixer and a weighing

New batching plant installed by the Roanoke Ready Mix Corp., Roanoke, Va.

batcher. The Dean St. Builders Supply Co., Founton, Mass., added a 1½-cu. yd. Chain Belt truck-mixer. The Consolidated Rock Products Co., Los Angeles, Cal., added a portable concrete plant and a 1½-cu. yd. Thew Lorain shovel.

Modern methods of lime-putty manufacture continued their invasion of this field. The Pennsylvania Supply Co., Harrisburg, Pa., began the production of lime putty with a Brooks-Taylor plant supplied by the Chicago Bridge & Iron Co. This company also operates three ready-mixed-concrete plants, a sand-and-gravel plant, a crushed-stone plant, and an aggregate-bituminizing plant. Two Concrete Transport Mixer Co. 1-cu. yd. truck-mixers were purchased to mix lime mortar.

The State Sand & Gravel Co., Indianapolis, Ind., also installed a Brooks-Taylor plant during the year. This is a two-tank unit and is the twelfth Brooks-Taylor plant to be installed in this country. The State Sand & Gravel Co. also recently took over a ready-mixed-concrete business and operates it as the Heston Certified Concrete Co.

Jahncke Service, Inc., New Orleans, La., early in 1938 put in operation a new Brooks-Taylor lime-putty plant supplied by the Chicago Bridge & Iron Co. Earlier a new concrete central-mixing plant had been built. Both plants are located in a new aggregates and material storage yard at Galvez St. on the New Basin Canal. The canal has been closed beyond this point and the Liberty St. yard is now used only for materials received by railway. The company now operates a fleet of 24 truck-mixers. These include 14 Blaw-Knox 2- and 3-cu. yd. mixers and 10 Concrete Transport 1-, 1½- and 2-cu. yd. mixers. The latter are also used to mix and transport lime mortar.

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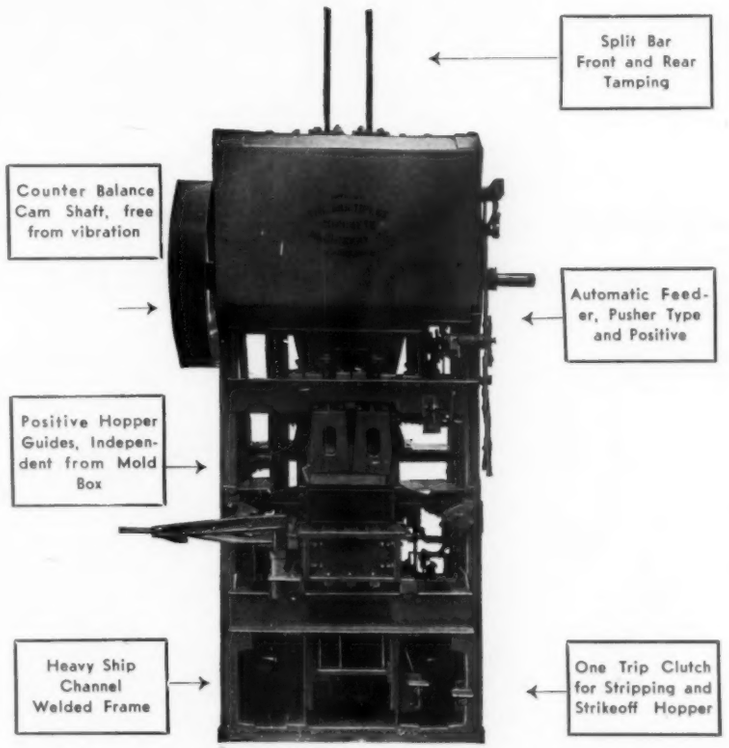
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The "gravity" system of transferring sacked cement from cars to plant storage shed is shown at the left. The portable belt-conveyors in the background are used to transfer aggregates from cars to the plant storage bins. These conveyors are the only power-driven units in the plant.

By W. E. TRAUFFER

Workmen "Taken for Ride" as Cement Is Unloaded to Plant

THE Sparling Ready Mixed Concrete Corp. of Fort Wayne, Ind., in May, 1938 put into operation a new concrete-batching plant to supply the demand in that city. In July a portable batching plant was erected near the southwest city limits to supply concrete for a highway widening job. Geo. H. Sparling, owner, operated the Sparling Sand and Gravel Co. from 1927 to 1930. Highway grading and excavation contracting engaged his attention until he entered this new field.

The plant is located beside a high fill on the main line on the Wabash Ry., and the top of the bin is nearly on a level with the track. Sand and gravel are discharged from hopper cars into a track hopper, from which a series of two portable belt-conveyors, driven by gasoline engines, distributes them into a 3-compartment Butler bin with a total capacity of 135 cu.yds. A Butler 2-cu.yd. batcher with a 2-beam scale is used. Aggregates can also be discharged from the cars into pits under the track, a Bucyrus-Erie ⅜-cu.yd. gasoline crane transferring them to stockpiles or the plant bins.

Dumping a batch of cement through a chute into a truck-mixer.

Sacked cement is received in box-cars and is transferred to a shed by gravity. The workers load a hand truck with sacks and then slide down with the load on a sloping wooden walkway with guides which prevent derailing. There is storage capacity for two carloads of cement. The cement is dumped from sacks through a chute directly into the truck-mixer along with the aggregates. Water is measured in a syphon-type tank.

The original fleet consisted of four Chain Belt Rex 1½-cu.yd. truck-mixers and in July, when the second plant went into operation, two 2½-cu.yd. Rex mixers were added. Five of these mixers are mounted on International trucks and one is on an Indiana chassis. Each mixer is driven by a Waukesha motor. The water in the 15-gal. mixer tanks is used to wash out the mixers on their return from delivering a load and this amount of water is deducted from the quantity put in the next batch. This practice almost entirely eliminates the caking of cement in the mixer.

All city sales are handled through the Old Fort Supply Co., a large building-material dealer with the necessary contacts and staff to handle sales. Mr. Sparling personally goes after county, state and other work outside the city limits.

The portable plant consists of Johnson bins and batchers. It supplied concrete for the construction of bridges, box culverts, headers, etc., for U.S. Hy. No. 24 which was widened into two 18-ft. lanes for 6 mi. beyond the city limits. Trucks are used there as needed.

A truck-mixer being loaded at the Sparling plant. Sacked-cement storage shed and car being unloaded are at right.

One of the six truck-mixers operated by this company shown being loaded under the batching plant.

LEFT—A platform was placed under the paver, operated as a central-mixing plant, to raise the discharge end for delivery into the agitator trucks. The ramp enabled dump trucks to discharge batched aggregates into the mixer skip. BELOW—The agitator drum delivers concrete into a spreading trough equipped with a screw conveyor which distributes the material across the 10 ft. of subgrade to form the new slab.

Paver Used as Mixing Plant to Serve Agitator Trucks

IN a paving project involving the widening of U. S. Highway No. 66 near St. Louis, Mo., the C. H. Atkinson Paving Co., of Chillicothe, Mo., because of special job conditions, recently adopted the expedient of using a standard concrete paver as a central-mixing plant serving a fleet of three 2-cu.yd. stationary-drum type agitators, mounted on light trucks. The contract called for converting the existing 3-lane, 30-ft. concrete pavement into a 4-lane route 40 ft. wide, with lip curb. The widened section was a 9-7-9-in. thickened-edge slab, 10 ft. wide.

The subgrade was barely wide enough to accommodate a 27-E paver, the minimum size allowed under the specifications, and the paver could not have been operated without squeezing forms out of line in soft material. In addition, the design called for drop inlets instead of shoulder drain basins. It was, therefore, practically impossible to operate the paver, to say nothing of handling the batch-trucks, on the subgrade. Due to load limits, operation of the paver on the existing pavement was officially ruled out. The only method left for the contractor was to employ his paver as a central-mixing plant, mounting it upon a wooden platform so as to raise the discharge end to a height sufficient to deliver into the bodies of the truck-mounted agitators. With this set-up, the economies of using bulk cement could be realized and the size of the batch going through the paver could be increased 10 per cent. or to a volume of 29.7 cu.ft.

To carry the concrete from the paver to the forms a fleet of three 1½-cu.yd. transport mixers, manufactured by the Concrete Transport Mixer Co., of St. Louis, and mounted on Dodge trucks, was sufficient to keep the paving crew busy. Rated at 1½-cu.yd. capacity when used as transport mixers, these machines actually carried 2.2 cu.yd. of concrete when employed as agitators, as was the case on this job. The concrete, agitated in transit by two revolving helical blades, was hauled a maximum of 1,000 ft. in each direction from the paver. Batches were discharged by tilting the agitator drum sideways, as illustrated. The side-discharge feature was advantageous, allowing the truck driver to pull alongside of and dump into a 10-ft. auger-type spreader trough.

The ramps for the paver and trucks were constructed in such a manner that they could be moved ahead at the end of each day's run, allowing the shortest possible haul. The paver was run off the ramps on its own power, in the same manner as the trucks.

Side-discharge of the agitator bodies facilitated delivery into the lateral spreading trough at the finishing machine.

Ready-Mixed Concrete an Aid to the Alert Contractor*

By FRANK W. SCHAFFER
Warner Co., Philadelphia, Pa.

IN Philadelphia the backbone of the ready-mixed-concrete business comes from concrete contractors who have discovered that instead of not being able to afford ready-mixed concrete, they can not afford to be without it. There are some jobs where the small amount required makes it impractical to use ready-mixed concrete. Those jobs are few, however.

In the matter of dollars and cents it is easy to figure the cost of aggregates, cement and labor, against the cost of ready-mixed concrete and labor. This, at first glance, usually shows a cost figure in favor of job-mixed concrete. However it does not take into consideration the repairs and depreciation on the mixer, the amount of materials wasted, stolen, and destroyed on the field-mixed job, and, in the wintertime, the trouble and delay encountered with frozen water lines and the necessity for heating materials. In addition to this, the loss of time when a breakdown occurs in the mixer must be considered.

Furthermore, contractors have a multitude of costs when they figure a job. Their success is dependent upon their ability to estimate these with reasonable accuracy. With ready-mixed concrete one is assured that, during the life of the job, the cost per yard of concrete is a known cost.

You are all familiar with the difficulty in getting the mixer man on a "field-mixed" job to obtain uniform consistency from batch to batch. Around this point, I think, revolves the real value of ready-mixed concrete for the contractor.

As an example, all alleys in Philadelphia are required to be paved with concrete. This material was mixed on the job with highly competitive prices for the work. The result was that much of the paving broke up, and a point was reached where either good concrete had to be placed or some other material would be used. To correct this trouble, the City Test Department adopted the practice of making core tests on all pavements placed with the result that the contractors immediately turned to ready-mixed concrete. This was because such concrete is certified as to strength and if any core failed to meet the test the ready-mixed-concrete company was held responsible and not the contractor.

The confidence with which ready-mixed concrete is used in Philadelphia is reflected in the action of architects and engineers who are specifying certified concrete. For this reason, in areas where a reliable source of ready-mixed concrete may be found, they are designing more in concrete than in other materials. This obviously leads to more work for the concrete contractor. By using ready-mixed concrete he can handle more work in less time, and save on labor costs, for the following reasons:

1. There is no large capital investment necessary to purchase costly mixing equipment or cover maintenance of existing equipment.
2. The expense of moving the mixer, from one job to another and sometimes back to the same job several times, to take care of additional concrete work that must follow another contractor, is eliminated.
3. Much larger pours are possible on smaller jobs which would not warrant a large plant if job-mixing was employed.
4. Fluctuation in labor is reduced to the minimum, as extra men are not required for short periods to handle materials during mixing of concrete.

Many hidden costs entailed by the concrete contractor who job-mixes his own concrete often are not taken into consideration, but if a true cost comparison is made between two jobs of equal size, one job-mixed and one ready-mixed, the arguments I have set forth are readily apparent. The additional plasticity and uniformity of ready-mixed concrete will eliminate nearly all honeycombing and sand streaks, and the patch work resulting therefrom.

Cost accounting on each part of the work is simpler. On federal, state and municipal work, where the specifications are not clear, the ready-mixed-concrete company can be of assistance and in many cases save time and money for the contractor.

The Warner Co. has a department which devotes its entire time to creating new work for the concrete contractor. One of these developments is the extended use of concrete for foundations and floors in houses. This work required more time than an individual contractor could give in introducing a new idea to the builder; to the changing of building codes so that concrete was not penalized in design, and to making the codes strict enough to prevent poor workmanship.

This year bids are being taken on over 500 houses specifying concrete foundations and over 200 specifying both concrete foundations and concrete first floors. Several builders are planning all-concrete houses and buildings because of the confidence created by good workmanship and materials in concrete foundations. Also, they are more conscious of good concrete work and are giving the reliable contractor a chance to get a fair price for a first-class job. It is much easier to sell a new use for concrete and extend the scope of the concrete contractor if the buyer has full confidence in the material and the only question is one of workmanship.

There are two large builders in the Philadelphia area who, between them, build nearly 50 per cent. of the houses erected in a normal year. One has standardized on concrete foundations, and the following letter is from the other builder:

"In a recent survey that we conducted on the monolithic concrete foundations that we are now using on our semi-detached dwellings, we discovered a few startling facts that have very definitely convinced us that we are heading in the right direction toward better and sounder small-house construction. A few of the advantageous qualities that we discovered in the results achieved by the use of concrete are:

"1. Cost.—By keeping a very accurate cost sheet concrete ran equal to stone and, in some instances, less than stone. This may be attributed to the use of concrete eliminating stone pointing and dashing.

"2. Time Saved.—We discovered that after our concrete gang became organized and fell into a daily routine, we could turn out one pair of dwellings one day quicker than the stone mason working at full capacity; also that in weather adverse to stone laying our concrete gang continued to work.

"3. Water and Damp-Proofing.—The use of concrete in our dwellings has eliminated any dampness or water that heretofore could seep through porous stone, causing musty, damp and atmospheric conditions ideal for decay and rot.

"4. Eliminating Settlement.—On one of our building operations we constructed twenty dwellings on one street. Ten of these dwellings were constructed with concrete foundations and the other ten with stone foundations. After eight months we discovered that every one of the ten built with stone foundations had to have adjustments made to doors and windows due to foundation settlement.

"5. Wall Finishes.—We discovered that a finished concrete wall lent itself

* Presented at the 1938 convention, American Concrete Contractors Assn.

to various economical and effective finishes. In the interior, a recreation room could be finished by simply painting the concrete walls.

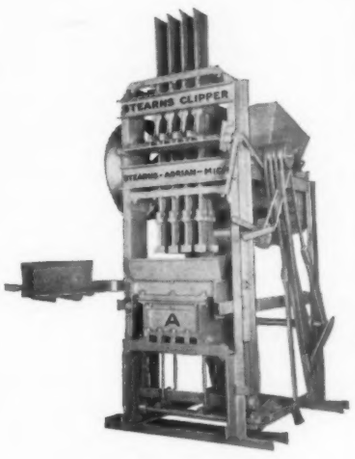
"6. Insulation.—Monolithic concrete foundations produced a basement entirely devoid of drafts and once the heating system was placed in operation these dwellings wherein concrete was used maintained a comfortably warm basement that helped to eliminate first-floor drafts.

"Initiation in the use of concrete for foundations has been so satisfactory that in the future we are going to plan our work so that we will use concrete for all foundations and eventually go a step further and employ a concrete slab for the first floor."

That letter speaks for itself.

Ready-mixed concrete expands the scope of the contractor. It assures a smooth wall without honeycombing and gives the contractor speed in delivery so that as many as six house foundations have been placed in one day on one job, 900 cu.yd. in 31 hr. on factory floors, and 1250 cu.yd. in 12 hr. in one generator-building foundation.

Attend the annual convention at Cincinnati, O., Jan. 25, 26, and 27 of the National Ready Mixed Concrete Assn.



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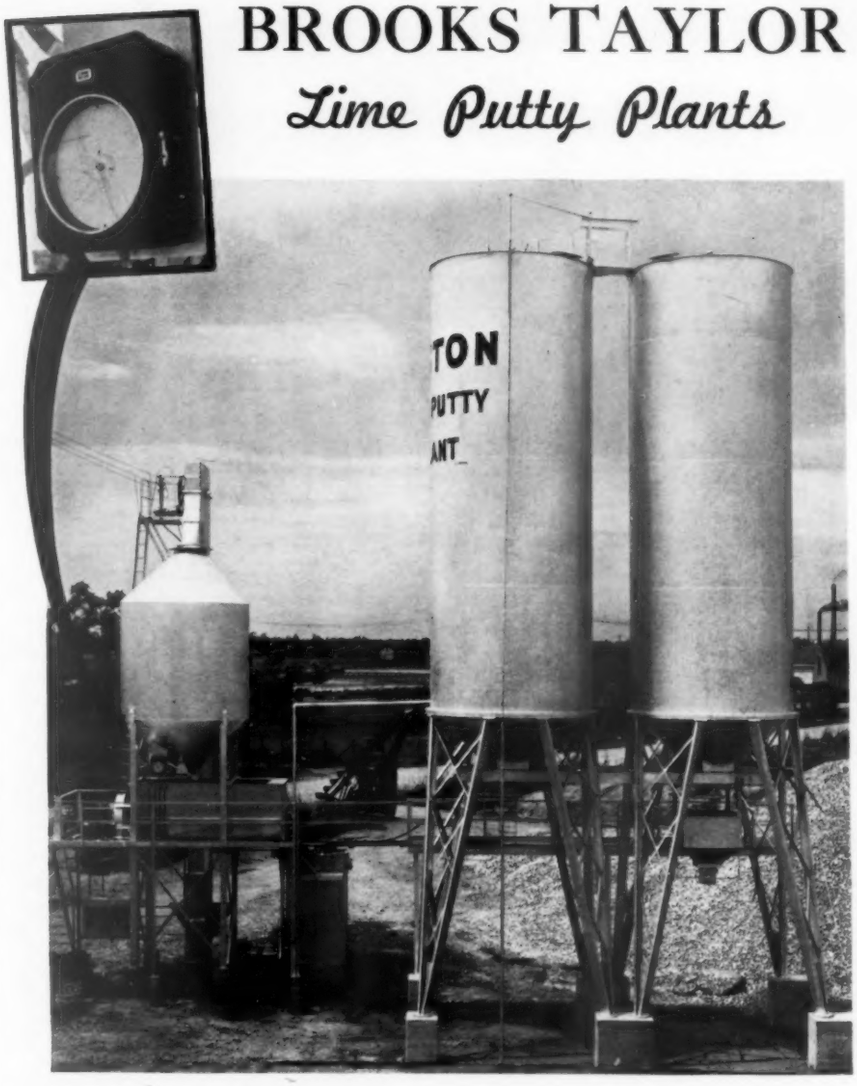
BROOKS TAYLOR

Lime Putty Plants



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B-628 Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PA.

The Microstructure of Concrete vs. Strength

By WALTER C. VOSS
Professor of Building Construction
Massachusetts Institute of Technology

IN approaching this subject it seems desirable to establish several basic end points. In such a complicated structure as concrete there is always the danger that the separate study of one or more of the variables involved may result in an erroneous conclusion when such a conclusion is considered in the light of other variables. Limited studies, when improperly publicized, are always conducive to the practical acceptance by the industry of one-sided theories. If such experimental data are based upon unnatural conditions the danger is greatly increased. It will be the intent of the writer to call attention to what he considers some of the basic phenomena and to present certain hypotheses. These, it is hoped, will be thoroughly tested on the basis of purely scientific fundamentals and with reference to our great experience to date.

Concrete differs from steel, wood and plastics in several very striking ways. In concrete we are cementing or "gluing" brittle, inorganic minerals together with a gel, composed in the main, of combinations of lime and alumina with silica. This gel is of the irreversible type. Once formed and allowed to harden it can not be reconstituted. The material from which the gel forms is synthetic in its nature and has been made to meet continuously changing specifications. We have applied no heat to our concrete as in steel and plastics, and we have not had the natural processes involved in the organic cellulose structures, as in wood. Neither wood nor steel show such a lack of homogeneity of structure from both the physical and chemical aspects, as does concrete. Nevertheless it is reasonable to expect strength and durability from concrete, and to be sure, such has been the case in many structures.

The type of disintegration in concrete is more likely to impair strength than is the case in the corrosion of steel. We seriously provide against the dangers inherent in the disintegration of wood. It is only recently that we have become concerned with the causes of disintegration in concrete. In fact, we have been led to believe that concrete which possesses increased strength also has every other desirable characteristic. Most engineers are becoming more and more concerned with "continued strength" rather than "early strength." There are those, however, even now who are so sure of their ground that they are willing to measure the desirability of concrete on the basis of the 7-day strength. There are many of us who are in serious doubt that this is really true. To substantiate our doubts becomes a tedious and complicated task.

Assuming then that concrete is a material which is inhomogeneous, highly variable in its constituents, and subject to the human equation to a very large extent, an analysis of the basic controlling factors will be valuable. Let us also assume that concrete is a mixture of fine and coarse aggregate which is held together by a gel or "glue" composed of portland cement and water. Considering the aggregate we may analyze its relation to the continued strength of the concrete from the following angles:

(a) chemical composition
(b) gradation
(c) surface characteristics, and
(d) soundness

The cement may, likewise, be analyzed on the basis of:

(a) chemical composition,
(b) fineness,
(c) relation to, or reaction with, water, and
(d) amount used.

The manipulation of the concrete, to which much attention has been paid, still affords much of our basic trouble. This may be analyzed by considering:

(a) method of mixing
(b) time of mixing
(c) method of deposition
(d) type of forms
(e) curing, and
(f) treatment of exposed surfaces.

Perhaps the foregoing is merely a repetition of what all of you already know, and seems to be far removed from the subject of this discourse. Nevertheless a careful comparison of structural characteristics with known factors will aid considerably in allowing the microscope to come to our aid. However, I shall merely outline those factors in the above lists which, although known to exist, have been given far too little weight in our research activities on concrete. I would have you keep in mind, in what I have to stay that I am considering strength from the standpoint of durable strength, not a 7- or 28-day laboratory test.

The chemical composition of the aggregate is important in that it either provides minerals which are complimentary to the process of cementation, are inert to it, or detract from its efficiency. Aggregates such as limestone aid in the process of cementation, quartzes and dense igneous rocks of high silica content are practically inert, and cherts, micas, feldspars and the like eventually have a deteriorating effect.

The gradation of the fine and coarse aggregates must be more perfect from the finest materials to the largest stones. Washed sand, as we know it in many localities is almost entirely devoid of the necessary fines. This can only mean particle interference, unless excesses of cement gel are available. We must pay more attention to gradation.

There are still many who adhere rigidly to the theory that the surfaces of the aggregate should be rough to produce the best results. It is far more important that the aggregate be sufficiently porous to assist in the removal of some of the excess water from the cement gel. When practically non-absorptive aggregate, even dry, is used this excess water accumulates to dilute the gel and to prevent intimate contact.

The soundness of the aggregate is quite important. If a brittle, crushed stone is used, particularly one which is made of a mineral which possesses cleavage to any degree, there are incipient planes of failure which together with the later checks in the gel may be directly responsible for disintegration. Even aggregates, which will pass the usual tests may not always be continuously satisfactory. Toughness and particle soundness are important.

So much has been written about the chemical composition of cement that it hardly seems necessary to say any more. It is an extremely important factor and our modern normal cements are not yet the answer. The answer lies in the proper balancing of strength with durable products of hydration, low heat and water-retention. Our strength complex has led us far afield. We must get back to the relationships of our matrix to the aggregate, the water, the workmanship and the effects of nature. A thorough study of kiln temperatures and their relation to cement behavior must be made, not merely as pure research, but as it may affect the resulting concrete.

About twenty years ago we entered upon the era of fine grinding. This was based upon the truism that the more

finely ground particles of the clinker were more active. This increased activity made more of the gel immediately available and thus increased the early strength of the concrete. The move was in the right direction. Not content with this "step-up" in strength, we added more limestone, obtained higher percentages of free $CaO \cdot SiO_2$, and thus further increased the strength. We are now finding out that we have introduced colloidal characteristics into the confusion. We find that we have forgotten to consider the coarser particles necessary to act as vehicles for the dissemination of these minute specks. We are adding dispersing agents as a result, and with what seems to be reasonable success. A little thought at the time finer grinding became the vogue, might have allowed an analysis as a successful substitute for experiment at the expense of the public. This phase needs well-rounded study.

Different cements, because of composition and particle size, react differently with water. Some require more water than others. Some produce greater plasticity than others. All, however, are incapable of holding all the water necessary to make a practical mix. The greater this excess water, and the denser the aggregate, the more water voids will be present. Excesses of such voids cause local excess shrinkages in the matrix and set up differential strains, which although small, may be repeated many times in the life of the concrete, thus impairing the all-important bond necessary for continued strength.

The cement-aggregate ratio presents another problem. It is probably generally accepted today that the major cause of disintegration in concrete is due to the loss of bond between the cement gel and the aggregate. It is also rather generally accepted that the cement gel exhibits the greatest volume change of all of the materials used in concrete. The volume changes of this gel due to alternation of wetting and drying are far greater than those due to temperature. Excesses of gel mean excesses of water voids, which in turn mean checks and cracks. If these are, or become connected with exterior surfaces, internal volume changes occur every time the concrete becomes wet. Add the effects of freezing and thawing, and rupture of bond must be the inevitable result. Continued bond failure means ravelling and progressive disintegration. High cement-aggregate ratios produce higher early strengths, but may be responsible for retrogression in use.

In order that I may not take too much of your time may I merely generalize upon manipulation. We are mixing our concrete for less than one minute; we are using methods which cause agglomerations of cement and water in our mixing devices; we are depositing in ways that cause segregation, that feature more responsible for disintegration than most anything else; we have changed to watertight forms of steel or plywood, which with excesses of cement and water cause peculiar hydraulic antics, aiding in segregation; we are using vibrators in ways which accentuate segregation and thereby vitiate whatever else may be advantageous; and finally we are treating our exposed surfaces in such a way as to cause excessive surface strains. Segregation is inherent in concrete, inasmuch as a coarse aggregate with a specific gravity of about 2.65 cannot remain suspended in a cement, sand and water mortar with a specific gravity of about 2.2, if excessive agitation is allowed.

Thus I have set the stage for a short discussion of the structure of concrete and how one may use the microscope to study strength. I have only one slide. It is characteristic of sections of concrete. It will serve to show certain typical behaviorisms of the material and will help me in pointing out what would seem logical hypotheses for the building of better concrete.

In order that I may be as constructive as possible, may I first say that I do not know the answers to many of these problems. Further I am fully cognizant of the commercial limitations which must be imposed. With these in mind I suggest that concrete would be much more durable and uniform if the following basic hypotheses are considered:

1. We must retrace our steps somewhat in the manufacture of cement. We must move toward lower heat, lower kiln temperatures, and well-graded grinding.
2. Mixes should be made as lean as possible, consistent with water-cement ratios and workability.
3. Strength must be secondary to density and uniformity.
4. Any method to remove excess mixing water, during the process of casting, should be encouraged.
5. Aggregates should be used dry.
6. Aggregates should be graded for maximum density, minimum of surface area, and minimum of particle interference. This may mean that washed sand has too few fines.
7. Aggregates should preferably have absorptions of over 2 per cent. wherever possible.
8. Methods for the consolidation of concrete without causing segregation should be encouraged.

The Sierra Minerals Co. has completed the erection of a new mica-schist plant near LeGrand, Cal.

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The new central-mixing and batching plant of the Grand Rapids Gravel Co., with part of the gravel plant in background.

Warning to Customers Promotes Water-Cement-Ratio Theory

ALWAYS regarded as one of the most progressive companies in the sand-and-gravel industry, the Grand Rapids Gravel Co. of Grand Rapids, Mich., under the guidance of Henry N. Battjes, president, expanded its operations in November, 1937 to service the Grand Rapids marketing area with precision-controlled ready-mixed-concrete.

The Grand Rapids Gravel Co. was reorganized in 1920, at which time its building material business was sold and the sand-and-gravel business retained. This company has gradually expanded its operations until it has become a leading producer of aggregates in Grand Rapids and western Michigan.

After studying various concrete plants throughout the country and drawing on the experience of other producers the company constructed one of the most flexible and modern plants in the industry. The plant is on the same property as the company's main (No. 4) gravel plant and is located on Highway M-21, 3½ mi. from down-town Grand Rapids. Its accessibility to the marketing area has proved valuable beyond expectations.

The charging plant is completely inclosed, with large sliding doors which can be opened and closed to allow the trucks to run through for charging operations. The aggregate-storage bins are covered with roofs. Aggregates for the plant are obtained by means of a 150-ft. belt-conveyor, directly connected to the gravel plant. When desired, the aggregates can be taken from the stock-piles, in which case the trucks discharge them into a hopper feeding a short auxiliary belt-conveyor which leads to the main conveyor. The aggregates are discharged into a Butler steel bin made up of three 60-cu.yd. compartments for sand and two sizes of gravel. Three arc gates control the discharge of the aggregates into the Butler 2-cu.yd. weighing batcher, which is equipped with a 3-beam scale and tell-tale dial.

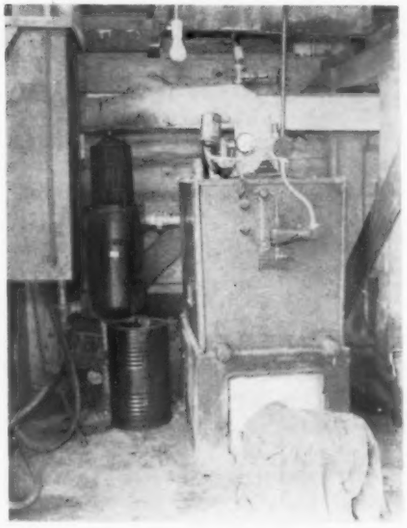
Cement is received in bulk in cars or trucks and is conveyed by a screw-conveyor to a 70-ft. bucket-elevator, which lifts it to the 180-bbl. cement-storage bin. A short inclined screw-conveyor feeds the cement from the bin into the Butler cement-weighing batcher which is equipped with a single-beam scale and a tell-tale dial. Cement is discharged from this batcher through a Fuller rotary valve. A hopper under the batchers has separate spouts for loading either directly into the truck-mixers or into a 2-cu.yd. Lakewood drum-type mixer when premixing is desired. The batching of aggregates and cement and the adding of water are done quickly by one operator.

Separate cement storage is maintained for sacked cement, high-early-strength cement and special-tested cement shipped in for specific projects. In these cases each cement is separately loaded into mixers from the cement-handling system.

Water comes from a well supplying the gravel plant. It is measured in a Lakewood siphon-type tank and is discharged into the mixers. A laboratory for determining the moisture content of the aggregate is located in the plant and frequent tests insure precision control of the concrete. Mixer-truck water tanks are used only to supply water for rinsing out the mixers upon their return from a trip. Jaeger 3½-cu.yd. truck-mixers and Chain Belt 2½-cu.yd. truck-mixers mounted on double-axle truck chassis are used.

All the delivery tickets are stamped as follows: "This batch of concrete contains the proper amount of water to give workability and the required strength specified. Further addition of water is at the customer's own risk." Extra water added requires the signature of the customer and a record is made on the ticket of the amount added. This practice has resulted in getting the various customers to accept the water-cement-ratio theory.

Provisions have been made for operating during freezing weather. An oil-

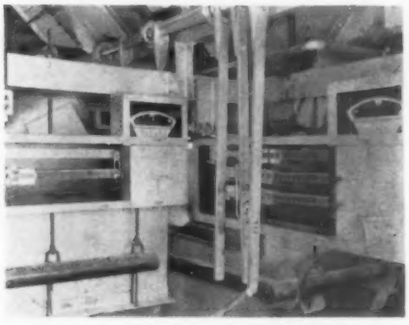


The boiler used to heat water and aggregates for cold-weather operation.

One of the 3½-cu.yd. truck mixers being loaded direct from the batchers.

fired copper-tube boiler and auxiliary large-size additional oil-fired boiler supply steam as required for heating the aggregates and the mixing water. These boilers heat an 850-gal. tankful of water and maintain the water at a temperature of 180 deg. F. during the operating period. Both boilers are used for large pours in very cold weather. On days when the demand is light one boiler is sufficient to carry the load. A Bell & Gossett circulating hot-water take-off is used.

The latest check on winter concrete was made early in December. On a pour of 100 cu.yd. per day on a grade-separation project of the Grand Trunk Railroad at Ada, Mich. a 15-mi. haul one way from the plant with the atmospheric temperature about 20 deg. F. —the concrete showed temperature between 75 and 80 deg. F., the testing being made on every load delivered. Standard test cylinders are made very frequently. These are taken by the City of Grand Rapids on all public work. A copy of testing detail is attached.



The cement and aggregate weighing batchers with scales and bin gate levers.

According to Mr. Battjes, some contractors were slow to adopt ready-mixed concrete, as they wanted to make more work for their own men by mixing concrete on the job. Newspaper advertising and direct follow-up of construction work have gradually increased the output.

Aggregate plant No. 4, which supplies the concrete plant, has been improved recently and now has a capacity of about 1,400 cu.yd. daily. Equipment for the production of railroad ballast containing 30 to 35 per cent. of crushed gravel was installed early in 1938. The oversize material is reduced by a Symons cone crusher and a Greenville roll crusher and their products are sized on a Simplicity 3-deck vibrating screen. Any surplus crushed gravel is sent through the gravel plant. A used 200-hp. Anderson Diesel engine, also installed early in 1938, supplies about 75 per cent. of the plant's power requirements.

The company has two other aggregate-producing plants. Plant No. 2, also at Grand Rapids, has a capacity of about 1,400 cu.yd. daily. This plant is used only for rail shipments. Another plant, which is within the City of Grand Rapids and is designated as No. 3, is used primarily for producing masons' and concrete sand. Any oversize material is added to the bank-run gravel. This plant is used for trucking only.

A load of concrete being delivered for a small residential improvement job.

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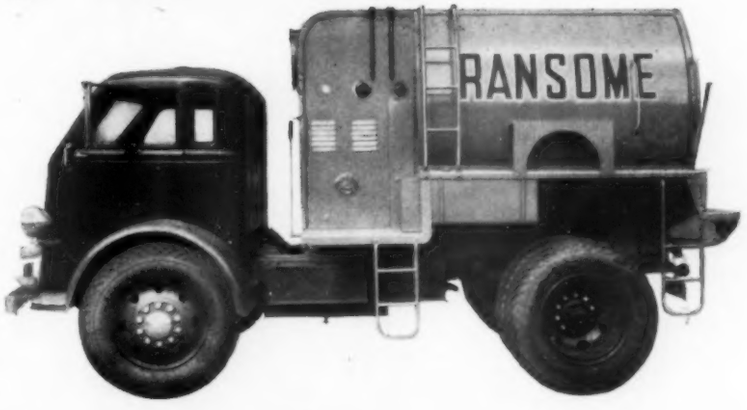

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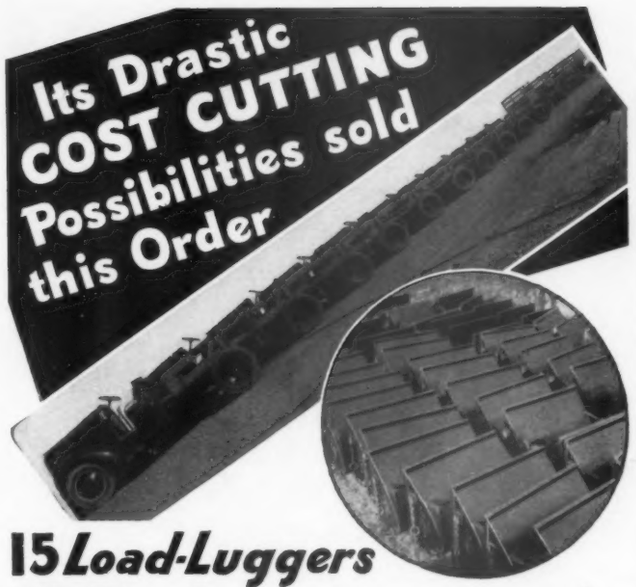

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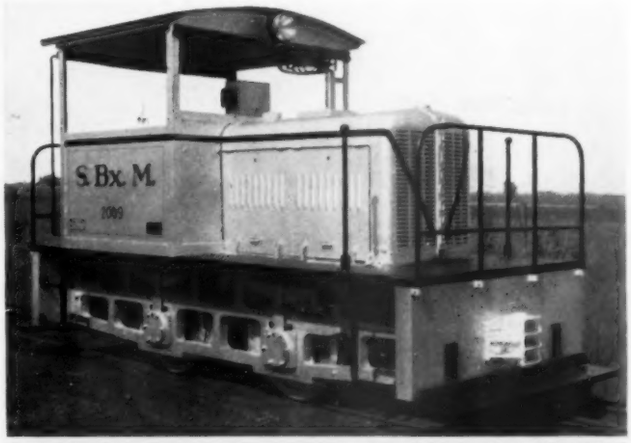

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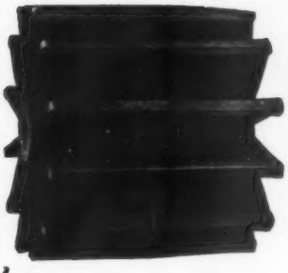

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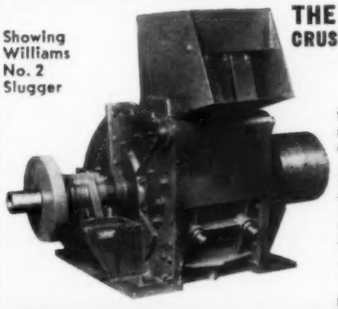

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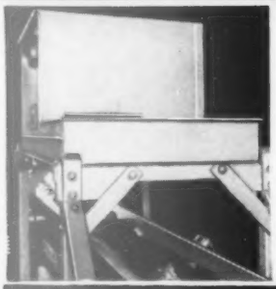

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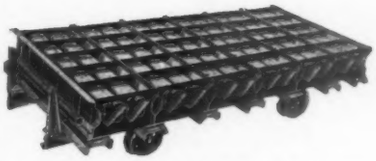
- ☐ Filters, Oil
- ☐ Fire Brick
- ☐ Flanges, Pipe
- ☐ Frogs and Switches
- ☐ Fuses, Blasting
- ☐ Gears
- ☐ Goggles
- ☐ Governors
- ☐ Grinding Balls
- ☐ Grizzlies
- ☐ Guns, Hydraulic
- ☐ Hoists, Air
- ☐ Hoists, Derrick
- ☐ Hoists, Drum
- ☐ Hoists, Motor Truck Body
- ☐ Hoists, Skip
- ☐ Hose, Air, Stream, Water
- ☐ Hose, Sand Suction
- ☐ Hydrators
- ☐ Kettles, Calcining
- ☐ Kilns, Rotary
- ☐ Kilns, Vertical
- ☐ Lime Putty Plants
- ☐ Linings, Kiln
- ☐ Loaders, Portable
- ☐ Loaders and Unloaders Box Car
- ☐ Locomotives, Diesel
- ☐ Locomotives, Gasoline
- ☐ Locomotives, Steam
- ☐ Log Washers
- ☐ Lubricants
- ☐ Measuring Devices
- ☐ Mills, Compartment
- ☐ Mills, Tube
- ☐ Mixers, Plaster
- ☐ Motors, Electric
- ☐ Motors, Gasoline
- ☐ Motor Trucks
- ☐ Motor Trucks, Ready-Mixed Concrete
- ☐ Nozzles, Hydraulic Mining
- ☐ Nozzles, Gravel Washing
- ☐ Nozzles, Spray
- ☐ Nozzles, Dust Settling
- ☐ Nozzles, Suction Hose
- ☐ Nuggets, Grinding Perforated Metal
- ☐ Poidometers
- ☐ Pulleys, Clutch
- ☐ Pulleys, Magnetic
- ☐ Pulverized Fuel Systems
- ☐ Pulverizers, Ball, Conical Pebble
- ☐ Pulverizers, Disc
- ☐ Pulverizers, Hammer
- ☐ Pulverizers, Ring
- ☐ Pulverizers, Rod
- ☐ Pulverizers, Roll
- ☐ Pumps, Centrifugal
- ☐ Pumps, Deep Well
- ☐ Pumps, Sand and Gravel
- ☐ Pumps, Slurry
- ☐ Pumps, Steam
- ☐ Radiators, Engine Cooling
- ☐ Rails
- ☐ Refractories
- ☐ Respirators
- ☐ Rollers, Conveyor
- ☐ Rolls, Crushing
- ☐ Rope, Wire
- ☐ Safety Appliances
- ☐ Sand-Lime-Brick Machinery
- ☐ Scales, Track
- ☐ Scales, Truck
- ☐ Scrapers, Dragline
- ☐ Screens, Revolving
- ☐ Screens, Shaking
- ☐ Screens, Vibrating
- ☐ Separators, Air
- ☐ Separators, Dry Centrifugal
- ☐ Separators Magnetic
- ☐ Shovels, Gasoline
- ☐ Shovels, Steam
- ☐ Skips
- ☐ Sleeves, Dredge
- ☐ Slugs and Nuggets, Grinding
- ☐ Speed Reducers and Gears
- ☐ Spray Nozzles
- ☐ Sprays, Paint
- ☐ Sprockets
- ☐ Steel, Tool
- ☐ Stokers
- ☐ Switches, Track
- ☐ Tanks, Concrete and Steel
- ☐ Tanks, Sand Settling
- ☐ Tanks, Wood
- ☐ Thickeners, Slurry
- ☐ Track, Portable
- ☐ Track Shifters
- ☐ Tractors, Crawler
- ☐ Tramways, Aerial
- ☐ Trippers, Belt
- ☐ Trippers, Tramway
- ☐ Unloaders
- ☐ Valves, Pump
- ☐ Washers and Scrubbers, Sand, Gravel, Stone
- ☐ Weighers, Automatic
- ☐ Welding Supplies
- ☐ Wheels, Car
- ☐ Winches
- ☐ Wire Cloth
- ☐ Wire Cloth, Manganese Steel

To be used for.....

Firm Name.....*Individual*.....

Address.....*City*.....*State*.....

START A NEW BUSINESS



This shows one of our Multiple Molds for casting 8x8x16" concrete blocks. We manufacture a complete line of Multiple Molds for blocks (both Rockface and plain), for brick, veneer blocks, etc. We are also owner and originator of the ZAGELMEYER SYSTEM of granite veneer for blocks.

Make
ZAGELMEYER
Waterproof Concrete Blocks

No Other System Produces a Block Equal to This!

A Start May Be Made With as Little as $500.00

The Zagelmeyer System of casting cement blocks in multiple molds produces a block that no other system can equal. Competition is eliminated. No better granite-face, water-proof block is made. This is your opportunity for good profits. Many good territories open. Write today for further information.

Zagelmeyer Cast Stone Block Machinery Co.
501 S. Henry St. BAY CITY, MICH.

'39 McCARTER '39

DESIGNS PROFITS

McCarter Mixers, with aggregate-weighing batchers

You furnish the problem—let McCarter furnish the answer! We specialize in the fabrication and erection of individually designed plants — "made to measure" in our shops—and engineered to give '39 methods with '39 profits.

Designers and Manufacturers uninterruptedly since 1827

The McCarter Iron Works, Inc.
NORRISTOWN PENNSYLVANIA

VISIBLE MIXING

While the Drum Revolves, You Can SEE What's Going On!

Very often the superintendent wants to OKay the mix, to make sure it is wet enough or dry enough, etc. With a SMITH-MOBILE, he merely opens the door and looks inside. No concrete will discharge unless the drum is reversed. This can't be done with old style truck mixers.

That's one reason why you'll appreciate the new SMITH-MOBILE. It enables you to look into the drum and inspect the batch, *while the drum is revolving*. You can SEE what's going on. Have the operator add water, if necessary, to get just the consistency you want.

• • •

Then consider the many other SMITH-MOBILE exclusive features: HIGH DISCHARGE, for example. No hoists or ramps required. Fast FEED CHUTE CHARGING. No troublesome, leaky hatch to open or close. Mixing and shrinking start instantly. Water introduced through feed opening. No clogged water bells buried in concrete. No wonder SMITH-MOBILE is the biggest truck mixer value on the market — barring none. Built and Guaranteed by SMITH, concrete mixer manufacturers since 1900.
Write for SMITH-MOBILE bulletin.

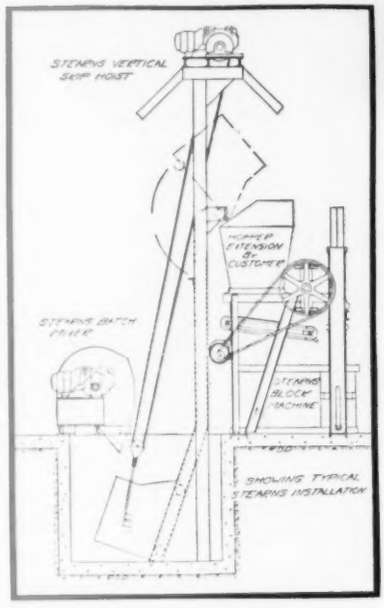
THE T. L. SMITH COMPANY
2887 N. 32nd STREET • MILWAUKEE, WIS.

SMITH-MOBILE
THE *Modern* TRUCK MIXER and AGITATOR

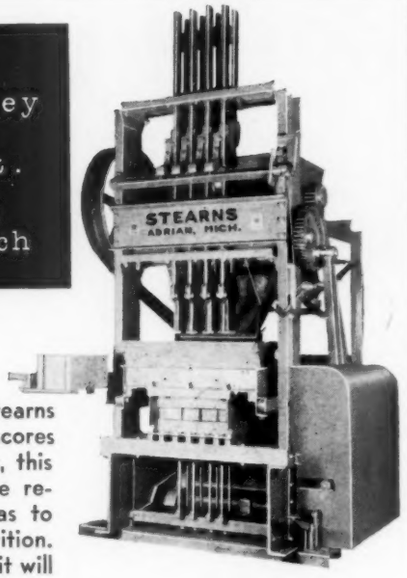
A 2420-½

I use Stearns Power Strippers because they produce fine, strong blocks at lowest cost.

John A. Whitman
Midland, Mich



Complete Concrete Products Plant Equipment—Power Strippers, Clipper Strippers, Mixers, Skip Loaders, Brick Machines, Manhole Block Machines and Straub Oscillating Attachments.



AMONG tamp machines, the Stearns Power Stripper stands pre-eminent. In scores of plants, just as it has in Whitman's, this equipment has made such remarkable reductions in the cost of production as to place its owners far ahead of competition. Capable of six operations per minute, it will produce more good blocks per man per day than any other machine of like price.

Before you buy ANY block machine, investigate the Stearns Power Stripper. Write for circular.

STEARNS
MANUFACTURING CO. - ADRIAN, MICH.
GENE OLSEN, PRESIDENT

While still one of the leading producers of tamp equipment, Stearns is also a pioneer in vibrating block machines—manufacturers of Stearns Jolt-crete, fully protected by patents issued and pending.

BARRETT LIFT-TRUCKS
ONE MAN HANDLES 48 BLOCKS
NO BREAKAGE

Available for fifteen days free trial without obligating you to buy.

Handle your green concrete products the way that more than 800 other concrete products plants do, WITH BARRETT LIFT-TRUCKS EQUIPPED WITH A SUPER-SPRING FRAME AND RUBBER TIRES. Eliminate breakage—joggling out of shape and spoilage. Save time, money and labor by eliminating all unnecessary handling and breakage. Take your blocks direct from the machine to the curing room—with ease and dispatch. One man handles 48 blocks of the 8x8x16 size—or, 32 blocks of the 8x12x16 size.
Write for illustrated circular.

BARRETT-CRAVENS COMPANY
3251 West 30th Street CHICAGO, ILL.
Representatives in all principal cities

SO MUCH COMFORT
SO LITTLE COST
★ ★ ★ ★ ★
FROM $2 SINGLE

HOTEL HENRY

The Henry gives you accommodations and facilities to meet your hotel requirements completely – yet at a price no greater than for ORDINARY accommodations elsewhere... Perfectly located. Surrounded by department stores – banks – office buildings.

VISIT THE **SILVER GRILL**
NEW, BEAUTIFUL RESTAURANT

Be sure to see the novel
DOG HOUSE
IN THE
FORTUNE BAR

FIFTH AVENUE & SMITHFIELD

PITTSBURGH

STRAYER PORTABLE CONCRETE PLANT

Plant in Transit

A complete portable mixing plant which reduces transportation time and cost to a minimum, saves costly set-up charges and avoids delays in starting concreting operation.

A plant with all controls centralized requiring, exclusive of cement handling, only one man for operation and having but a single power unit driving the mixer and elevator, thus reducing initial, operating and maintenance costs.

A plant compactly built to meet highway clearances but with the necessary equipment to produce 32 cubic yards of concrete per hour.

Write for details.

Plant Ready to Operate in One Hour's Time

ERIE STEEL CONSTRUCTION CO.
Erie, Pennsylvania

TWO REASONS for EXTRA CONCRETE PROFITS

PORTABLE MATERIAL HOIST WITH SCALE **&** THE TRANSPORT MIXER

PORTABLE—Easily hauled behind truck from job to job on pneumatic tires.

USEFUL—For handling materials in the yard and for rental to contractors.

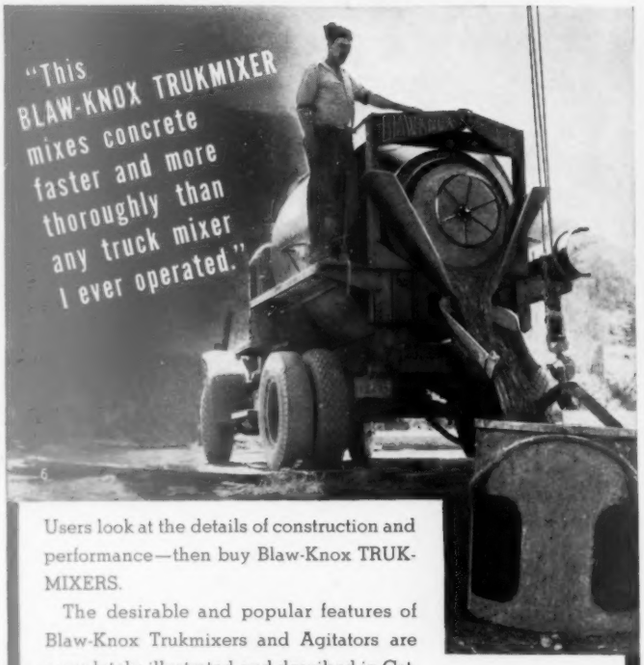
MULTI-SECTIONS—Adaptable to wet or dry materials from ground to third floor elevations.

Capacities from 1-ton upward. Priced to make its use profitable for even a moderate-sized yard.

Send for More Data on Hoists and Mixers

Rugged Construction—Open Top—Visible Mixing—Fast Discharge, Side or Rear—Lower Initial Cost—Lower Operating Cost—Highest Quality Concrete, Mortar or Plaster —Truck or Plant-Mixers.

CONCRETE TRANSPORT MIXER COMPANY
650 ROSEDALE AVENUE Telephone CAbany 5211 ST. LOUIS, MO.

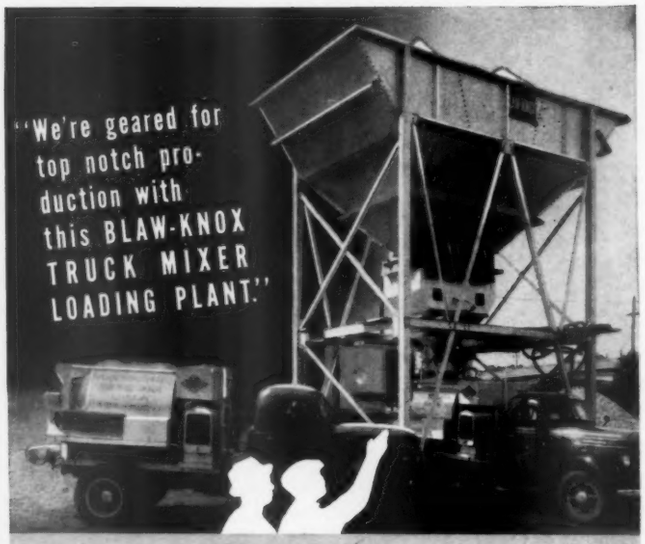


Users look at the details of construction and performance—then buy Blaw-Knox TRUK-MIXERS.

The desirable and popular features of Blaw-Knox Trukmixers and Agitators are completely illustrated and descibed in Catalog No. 1582. Send for your copy.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PENNA

BLAW-KNOX TRUKMIXERS *and Agitators*



Blaw-Knox is the only manufacturer offering complete equipment for ready mixed concrete; including Trukmixers and Agitators, Ready Mixed Concrete Plants and Truck Mixer Loading Plants of all capacities and types.

Send for Blaw-Knox Catalogs Nos. 1566 and 1582.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PA.

BLAW-KNOX *Truck Mixer* LOADING PLANTS

"COMMERCIAL" CORED *Steel* PALLETS

Will not crack or break.

Light in weight, less than plain pallets.

Can be used on Low Cost Machines.

Permit uniform and quick curing.

Makes sharp edges and deep mortar grooves.

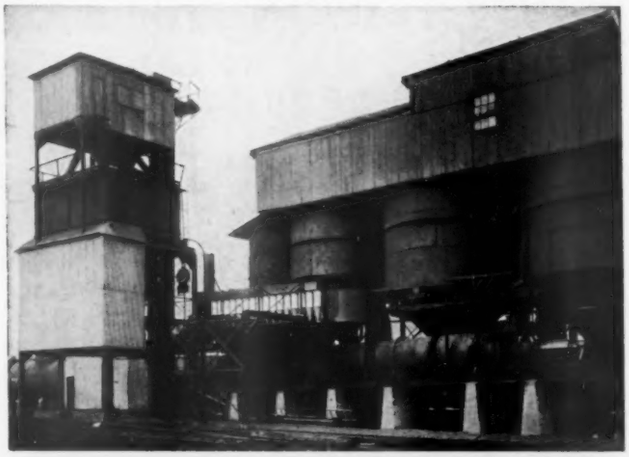
No weak places or core bar marks.

Better Ashlar and Header block production.

Close fit to core box.

Write us or your machinery maker.

The COMMERCIAL SHEARING & STAMPING COMPANY
YOUNGSTOWN, OHIO.



WARREN ASPHALT PLANTS
HOT MIX —— COLD MIX
—— OR ——
COMBINATION UNIT FOR BOTH TYPES
CAPACITY DESIGN AND ARRANGEMENT TO MEET ANY REQUIREMENTS

Designed and Built
—— By ——
WARREN BROTHERS ROADS CO.
P. O. BOX 1869
Boston Massachusetts

Your SURPLUS AGGREGATE

Office Phone: Kilbourne 6190 — Factory Phone: Hanscom 2711

TINTED
COMMON
FACED

RIVERSIDE DUNBRIK CO.
Office and Display: 4417 W. North Ave.
Factory: Two miles north of Brown Deer
RIVER ROAD
•
MILWAUKEE, WISCONSIN

DUNBRIK
20%
LIGHTER WEIGHT
BIG SAVING IN
CONSTRUCTION

W. E. Dunn Mfg. Co.,
Holland, Mich.

Gentlemen:

Please forward to us your literature on your DUNTEX roof tile and concrete joists. If the earning possibilities in these are as good as DUNBRIK has proven itself, we would like to add this equipment at the earliest possible time.

We are proud of the progress we have made with DUNBRIK for the short time we have been in the business. At the present time we are just completing an order of over 250,000 for an addition to the Chain Belt Company plant. Just previous to this, we sold over 150,000 for a County garage and the Milwaukee Sewerage Commission has used well over 100,000. Our last years sales totalled over a million DUNBRIK and the outlook this year is for well over three million.

In residential construction the wide range of colors possible with your process has been very helpful in getting a good volume of this business at a better than anticipated profit, as our costs are running from $7.00 to $9.00 per thousand, depending upon color, with selling prices ranging from $17.00 to $24.00.

We are also glad to be able to tell you that our common brick production costs too are lower than your original estimate. Our records now show a cost below $5.00 per thousand.

Thanking you for your constant cooperation, I remain,

Yours very truly,
RIVERSIDE DUNBRIK COMPANY
John A. Krause
Pres.

JK:A

MAKE EXTRA EARNINGS by turning your surplus aggregate into a finished building material. A material demanded by the trade for its permanence and low cost. Riverside Sand & Gravel Co. and other producers have shown the way to new and profitable manufacturing businesses with big future possibilities.

WE EQUIP YOU with new line-production machinery, permitting large production with only one or two men. Equipment costs but a fraction of what would be required for other processes of equal capacity.

INVESTIGATE. Learn how DUNBRIK builds better buildings cheaper. How you can produce at lowest cost—many sizes and in full range of colors and textures. Write today for "4 Keys to Manufacturing Success." It may mean extra earnings of thousands of dollars a year for you.

W. E. DUNN MFG. CO.

420 W. 24th St. Holland, Michigan

PROFITABLE

"I MAKE FOUR PROFITS FROM ONE PRODUCT!

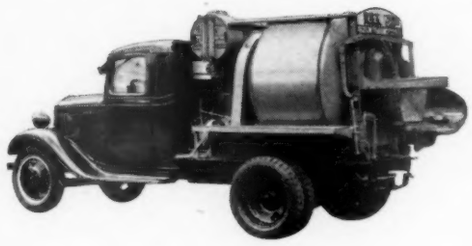
—SINCE MOTO-MIXERS AND I WENT INTO THE READY-MIXED CONCRETE BUSINESS"

● *Four ways to make money*—that's what Rex Moto-Mixers offer the building supply dealer of today! It's an opportunity which has doubled and even tripled the yearly sales of sand, stone and cement for building supply dealers who have taken advantage of it. For in mixing, transporting, and placing Moto-Mixed concrete, these concerns now can make profits simultaneously on sand, stone, cement and concrete—where before each presented a distinct selling job by itself.

Prominent among the concerns to adopt the Rex Four-Profit Plan is E. W. Bisett & Sons, building supply dealers of Bradford, Pennsylvania. Supplying ready-mixed concrete to the oil field area has meant adding to their Moto-Mixer fleet from time to time in order to handle a volume of business which is now more than twice what it was in the pre-Moto-Mixer days.

This record of increased sales after turning to Moto-Mixers is impressive, but not out of the ordinary. You, too, can enjoy a greater yearly volume of sales in sand, stone and cement when you turn to Rex Moto-Mixers and Agitators.

Investigate today! Send the coupon.



READ WHAT R. W. BISETT SAYS ABOUT THE EXCLUSIVE REX CHAIN DRIVE

"Our experience has proved that a Rex Chain Driven Mixer is particularly well adapted to our operation owing to the fact that our Mixer equipment is subjected to severe twists and strain when delivering concrete to the various oil field locations. The Chain Belt Drum allows much more flexibility without putting undue twists on the drive shaft and transmission of the mixer itself." R. W. Bisett (signed).

REX

CHAIN BELT COMPANY of Milwaukee

MOTO-MIXERS

CHAIN BELT COMPANY
1646 W. Bruce St., Milwaukee, Wis.

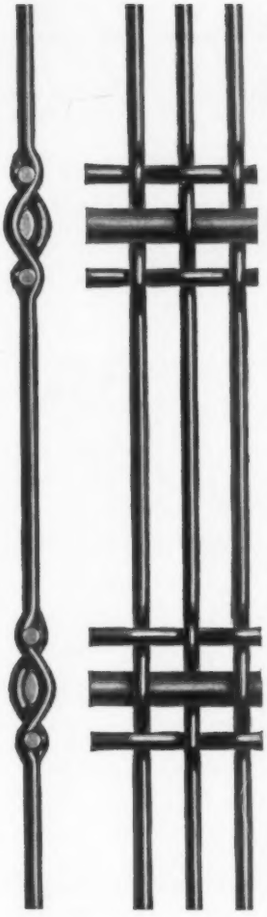
Please send me a copy of "Payloads" which tells about the Rex Four-Profit Plan.

Firm Name.....

By (Title).....

Address.....

City.....*State*.....



STA-TRU

Long-Mesh Woven Wire Screens

made to work under tension and vibration.

The straight stay - bars carry ALL the tension. The crimps in the round wires can not be stretched or broken. The screen can not be caused to sag or split by the pull of the tensioning device.

LUDLOW-SAYLOR

WIRE CO. ST. LOUIS

Enjoy Real Haulage Economy

with

DAVENPORT INDUSTRIAL LOCOMOTIVES

Your most vital concern in connection with the locomotives you rely upon is ECONOMY. Real economy demands not only efficient performance but the continuous performance which arises out of sturdy dependability year after year.

Davenport Industrial Locomotives have proven their worth on every continent and every type of haulage assignment for over forty years.

As you contemplate new locomotives we urge your careful consideration of Davenports. Tell us what your requirements are and Davenport engineers will gladly submit competent and reliable recommendations without the slightest obligation. DAVENPORT LOCOMOTIVE WORKS (a Division of Davenport Bessler Corporation), DAVENPORT, IOWA.

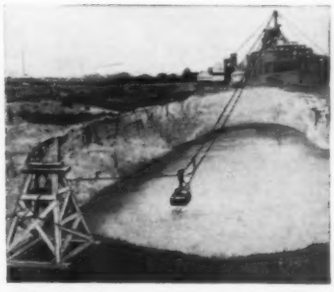
Write TODAY for Descriptive Catalog

PLANT AND MAIN OFFICE—DAVENPORT, IOWA
New York and Export Office—30 Church St.
Cable Address "Brosites"

DAVENPORT — Sold all over the World — INDUSTRIAL LOCOMOTIVES

DAVENPORT LOCOMOTIVE WORKS

GASOLINE • DIESEL • STEAM
DIESEL ELECTRIC • GAS ELECTRIC



This picture shows a 2 cu. yd., 700-ft. span Sauerman Slackline Cableway digging 150 tons of gravel per hour from a deep, wet pit. Material is handled in a straight-line operation to top of plant at cost of few cents per ton.

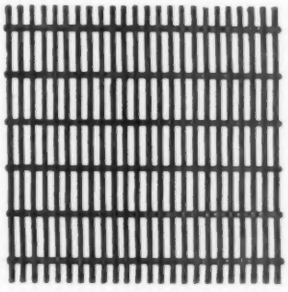
SAUERMAN LONG RANGE MACHINES

For Digging, Conveying, Stockpiling

WHETHER your problem is to dig gravel from a deep pit, high bank or river, or to convey loose rock from quarry to crusher, or to stockpile and reclaim mineral aggregate—there is a type and size of Sauerman machine to meet your needs. Give us a description of your problem and we will offer our suggestions on equipment for your consideration. Catalog illustrating several hundred typical installations mailed free on request.

SAUERMAN BROS., INC., 434 S. Clinton St., Chicago

Above is illustrated one of the various ways of using Sauerman Drag Scrapers for storing and reclaiming materials on ground alongside plant. A scraper is the most economical and flexible equipment for storage work.



Rolled Slot

ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.

2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
574 E. 78th St. CLEVELAND, OHIO

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified.

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Aggregate-Bituminizing Plants
Hetherington & Berner, Inc.
McCarter Iron Works, Inc., The
*Warren Brothers Roads Co.

Aggremeters
Erie Steel Construction Co.

Agitators, Thickeners and Slurry Mixers
*Hardinge Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Air Compressors (Portable)
Gardner-Denver Co.
*Ingersoll-Rand Co.

Air Compressors (Stationary)
Fuller Company
Gardner-Denver Co.
*Ingersoll-Rand Co.

Air Filters
*Blaw-Knox Co.
Clark Dust Control Co.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Air Pumps
Gardner-Denver Co.
*Ingersoll-Rand Co.

Air Separators
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
Lime & Hydrates Plants Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Sly Mfg. Co., W. W.
Sturtevant Mill Co.
*Williams Patent Crusher & Pulverizer Co.

Alloys (Steel)
Chain Belt Co.
Chicago Steel Fdry. Co.
Frog, Switch & Mfg. Co.
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.

Ash and Refuse Handling Equipment
Chain Belt Co.
*Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.
Taylor-Wharton Iron & Steel Co.

Asphalt Mixing Plants
Hetherington & Berner, Inc.
McCarter Iron Works, Inc., The
*Warren Brothers Roads Co.

Automatic Feeders
*Fuller Company
*Hardinge Co.
*Link-Belt Co.
Schaffer Poidometer Co.

Automatic Weighers
*Blaw-Knox Co.
Erie Steel Construction Co.
*Fuller Company
*Jaeger Machine Co.
*Merrick Scale Mfg. Co.
Schaffer Poidometer Co.

Backfillers
*Austin-Western Road Machy. Co.
*Bucyrus-Erie Co.
*Lima Locomotive Works
Marion Steam Shovel Co.
Northwest Engineering Co.

Balls (Grinding)
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Straub Mfg. Co.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.

Balls (Tube-Mill, etc.)
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Smidth & Co., F. L.
Straub Mfg. Co.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.

Barges (Steel)
*Chicago Bridge & Iron Co.

Bearings (Anti-Friction)
Hetherington & Berner, Inc.
*Link-Belt Co.
Robins Conveying Belt Co.
SKF Industries, Inc.
*Sprout, Waldron & Co.
Timken Roller Bearing Co.

Bearings (Ball)
SKF Industries, Inc.

Bearings (Roller)
SKF Industries, Inc.
Timken Roller Bearing Co.

Belt Drives
Chain Belt Co.

Belting
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Manhattan Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Belting (Multiple V)
Manhattan Rubber Mfg. Co.
Republic Rubber Co.

Belts (Fan)
Quaker City Rubber Co.
Republic Rubber Co.

Bin Gates
Chain Belt Co.
Erie Steel Construction Co.
*Fuller Company
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Bins (Steel)
*Austin-Western Road Machy. Co.
*Blaw-Knox Co.
*Chicago Bridge & Iron Co.
Erie Steel Construction Co.
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.
*Universal Crusher Co.

Bit Grinders
Gardner-Denver Co.
*Ingersoll-Rand Co.

Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
Atlas Powder Co.
National Powder Co.

Blasting Supplies
Atlas Powder Co.
*Ensign-Bickford Co.
National Powder Co.

Block Machines (Concrete)
Anchor Concrete Machy. Co.
Dunn Mfg. Co., W. E.
Kent Machine Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Block Machines (Power Press, Concrete)
Anchor Concrete Machy. Co.
Dunn Mfg. Co., W. E.
Kent Machine Co.
Multiplex Concrete Machinery Co.
R & L Concrete Machinery Co.
Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Blocks (Sheave)
*Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
*Sprout, Waldron & Co.

Blowers
Clark Dust Control Co.
*Sly Mfg. Co., W. W.

Bodies (Motor Truck, Concrete Mixing)
*Blaw-Knox Co.
Concrete Transport Mixer Co.
Jaeger Machine Co.
Ransome Concrete Machinery Co.
Smith Co., T. L.

Bodies (Dump Truck)
Commercial Shearing & Stamping Co.
*Easton Car & Construction Co.

Borings (Core)
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Brick Machines (Concrete)
Dunn Mfg. Co., W. E.
R & L Concrete Machinery
Stearns Mfg. Co.

Brick Manufacturing Equipment
Dunn Mfg. Co., W. E.
Stearns Mfg. Co.

Bronze Work (Ornamental)
*Tyler Co., W. S.

Bucket Elevators (See Conveyors and Elevators)

Buckets (Asphalt)
McCarter Iron Works, Inc., The

Buckets (Clamshell, Orange-Peel, Etc.)
*Blaw-Knox Co.
Erie Steel Construction Co.
Frog, Switch & Mfg. Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Owen Bucket Co.
Taylor-Wharton Iron & Steel Co.

Buckets (Dragline—Cableway)
*Bucyrus-Erie Co.
Erie Steel Construction Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Buckets (Dump)
*Brooks Equip. & Mfg. Co.
*Dempster Bros. Inc.
*Jaeger Machine Co.

Buckets (Elec. Heated, Weighing)
*Easton Car & Construction Co.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Chicago Steel Fdry. Co.
Cross Engineering Co.
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

Buggies (Dump)
*Koehring Co.
*LeTourneau, Inc., R. G.

Bulk-Cement Storage Plants
*Chicago Bridge & Iron Co.
*Sprout, Waldron & Co.

Bulldozers
*LeTourneau, Inc., R. G.

Cableways
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Leschen & Sons Rope Co., A.
*Sauerman Bros., Inc.

Caps (Blasting)
Atlas Powder Co.
National Powder Co.

Caps (Blasting, Electric)
Atlas Powder Co.
National Powder Co.

Capstans (See Winches and Capstans)

Car Dumpers
*Link-Belt Co.

Car Pullers
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
*Link-Belt Co.

Car Wheels — (See Wheels — Car)

Carriers
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Carryalls
*Austin-Western Road Machy. Co.
Koehring Co.
*LeTourneau, Inc., R. G.

Cars (Block, Concrete)
*Link Belt Co.
Multiplex Concrete Machinery Co.

Cars (Industrial)
*Easton Car & Construction Co.

Cars (Quarry and Gravel Pit)
*Austin-Western Road Machy. Co.

Castings
Chain Belt Co.
Chicago Steel Fdry. Co.
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Hardinge Co.
Hetherington & Berner, Inc.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan & Stone Corp.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete Mixing Plants (Comp.)
Erie Steel Construction Co.
*Jaeger Machine Co.
*Sprout, Waldron & Co.

Chain (Dredge and Shovel)
Taylor-Wharton Iron & Steel Co.

Chain Attachments
Chain Belt Co.
Taylor-Wharton Iron & Steel Co.

Chain Drives
Chain Belt Co.
*Link-Belt Co.

Chain (Elevating and Conveying)
Chain Belt Co.
Cross Engineering Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Sprout, Waldron & Co.

Chutes and Chute Liners
Chain Belt Co.
Cross Engineering Co.
Frog, Switch & Mfg. Co.
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
Taylor-Wharton Iron & Steel Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.

TO HELP YOU CUT SCREENING COSTS

Resolve now to cut screening costs in 1939.
You can do it with Hendrick Products:

Hendrick Perforated Plate for Vibrating Screens
- uniform mesh maintained for the life of the plate
- full clearance prevents clogging
- hard tempered steel resists abrasion . . . long lasting
- in any size or shape of perforation

Hendrick Double Corrugated Plate
- for better screening on vibrating screens

Hendrick Perforated Plate for Revolving Screens

Elevator Buckets
- all types—all sizes

Light and Heavy Steel Plate Construction
- hoppers—chutes—casings

Write for Prices or Literature

HENDRICK MANUFACTURING COMPANY

39 Dundaff Street

Carbondale, Pa.

Kuntz LIME PLANTS . .
FROM FLORIDA TO HAWAII!

CUMMER LIME & MFG. CO., KENDRICK, FLA.

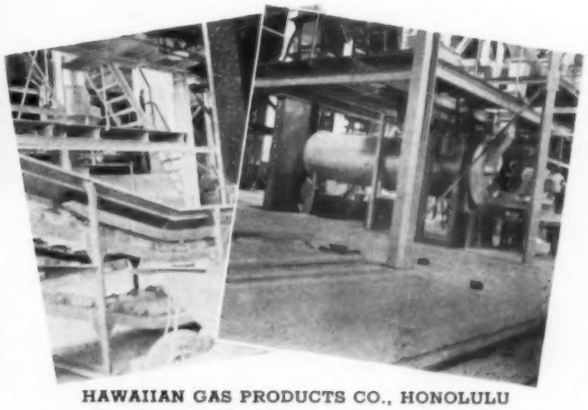
New $150,000 lime plant, Ocala, Fla., Kuntz-equipped throughout. Ultra-modern development for the production of a full line of cement products, including a new cast block unit. The Kendrick operation includes crushing plant and complete masonry-unit factory. Crushing plant designed and located for special selection and preparation of kiln stone. Kiln capacity 40 tons per day.

Kuntz-designed and engineered lime and hydrate plants are recognized 'round the world as THE basic equipment for reducing limestone to lime and allied products.

The Cummer Lumber Co., shown at left, is one of Florida's oldest and best known pioneer concerns which has been developing its lime rock deposits at Kendrick since 1922. It is now operating a complete Kuntz designed lime and masonry-unit plant for large scale operation.

The Hawaiian Gas Products Co., Honolulu, shown below, investigated American, Canadian and European plants before replacing their coke burning limestone kiln with the Kuntz standard combination-fired lime kiln.

Kiln view delivering from Conveyor — Hydrating plant



HAWAIIAN GAS PRODUCTS CO., HONOLULU

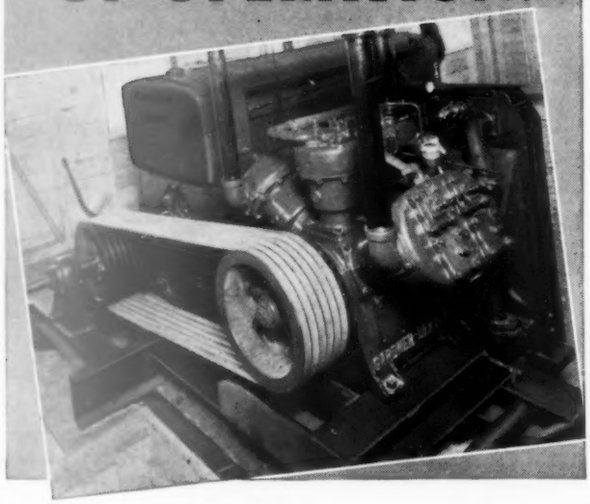
Another Kuntz installation. Caustic lime, hydrate and CO_2 plant. Supplies oxygen and acetylene gas to U.S. Army and Navy for welding. Also furnishes hydrogen, liquid CO_2 and dry ice for Island refrigeration trade.

Write for Information

LIME & HYDRATE PLANTS CO.

P. O. BOX 574 — YORK, PA.

ONLY 20 MINUTES "TIME OUT" IN 2½ YEARS OF OPERATION!



● In Quebec, a Gardner-Denver "WBH" Compressor, with "Caterpillar" Diesel drive, has been in operation for 2½ years—running on an average of two 8-hour shifts a day. Thus far, *only 20 minutes* working time has been lost on account of repairs—and the repairs cost $1.20. Fuel and lubricating costs for the 2½ years' period have averaged only 55c per hour.

Such performance is typical of Gardner-Denver "WBH" Compressors. Mine and quarry men who have seen the Gardner-Denver "WBH" Compressor in operation pronounce it the most suitable compressor plant for use in mine and quarry work. It will pay you to investigate—write us today for complete information. Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER

S I N C E 1 8 5 9

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Chute Lining (Rubber)
Manhattan Rubber Mfg. Co.

Classifiers
*Deister Machine Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Simplicity Engr. Co.
Straub Mfg. Co.
Sturtevant Mill Co.

Cleaners (Oil)
Hilliard Corp., The

Clips (Wire Rope)
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Leschen & Sons Rope Co., A.

Clutches
*Link-Belt Co.
*Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

Concrete Breakers (Air)
Gardner-Denver Co.
*Ingersoll-Rand Co.

Concrete Mixers
*Blaw-Knox Co.
Chain Belt Co.
Erie Steel Construction Co.
*Jaeger Machine Co.
*Koehring Co.
Smith Co., T. L.

Concrete Products Plant Equipment
Universal Concrete Pipe Co.

Concrete Slab Raising Equipment (Mud Jacks)
*Koehring Co.

Condensers
*Ingersoll-Rand Co.

Cones (Sand-Washing)
*Chicago Bridge & Iron Co.
*Link-Belt Co.
Smith Engr. Works

Conveyor Belting
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Quaker City Rubber Co.
Republic Rubber Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Conveyor Idlers and Rolls
Chain Belt Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.

Conveyors and Elevators
Bacon, Inc., Earle C.
Chain Belt Co.
Chicago Steel Fdry. Co.
Cross Engineering Co.
*Fuller Company
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
*Gruendler Crusher & Pulverizer Co.
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
McLanahan & Stone Corp.
New Holland Machine Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Straub Mfg. Co.
Sturtevant Mill Co.
*Universal Crusher Co.

Conveyors (Pneumatic)
*Fuller Company

Conveyors (Ready-Mixed Concrete)
*Blaw-Knox Co.
Chain Belt Co.
Concrete Transport Mixer Co.
*Haiss Mfg. Co., Geo.
*Jaeger Machine Co.
*Link-Belt Co.
Ransome Concrete Machinery Co.
*Robins Conveying Belt Co.

Coolers (Clinker)
*Fuller Co.
Link-Belt Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

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*Smidth & Co., F. L.

Couplings (Flexible and Shaft)
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Couplings (Hose, Pipe, Etc.)
*Ingersoll-Rand Co.

Cranes (Crawler and Locomotive)
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
*Koehring Co.
*Lima Locomotive Works
*Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.

Cranes (Electric Traveling)
Erie Steel Construction Co.

Cranes (Overhead)
Erie Steel Construction Co.

Crusher Parts
*American Pulverizer Co.
Frog, Switch & Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.

Crushers (Cone)
*Nordberg Mfg. Co.

*See also information in the 1938 Pit and Quarry HANDBOOK.

Crushers (Hammer)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Brooks Equip. & Mfg. Co.
*Dixie Machinery Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lime & Hydrate Plants Co.
Straub Mfg. Co.
Sturtevant Mill Co.
Taylor-Wharton Iron & Steel Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Jaw and Gyratory)
*Austin-Western Road Machy. Co.
Bacon, Inc., Earle C.
Brooks Equip. & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Nordberg Mfg. Co.
Smith Engr. Works
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.

Crushers (Ring)
*American Pulverizer Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Roll)
*Austin-Western Road Machy. Co.
*American Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Robins Conveying Belt Co.
Straub Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Rotary)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
New Holland Machine Co.
*Williams Patent Crusher & Pulverizer Co.

Crushing Rolls
*Austin-Western Road Machy. Co.
Frog, Switch & Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Straub Mfg. Co.
Sturtevant Mill Co.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Cutter Heads (Dredging)
*Eagle Iron Works

Detonators
Atlas Powder Co.
National Powder Co.

Diaphragms (Rubber)
Quaker City Rubber Co.

Diesel Engines (See Engines—Diesel)

Dipper Parts
Frog, Switch & Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Dippers and Teeth (Power Shovel)
*Bucyrus-Erie Co.
Frog, Switch & Mfg. Co.
*Koehring Co.
Taylor-Wharton Iron & Steel Co.

Dragline Cableway Excavators
*Bucyrus-Erie Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
Erie Steel Construction Co.
*Koehring Co.
*Lima Locomotive Works
*Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.

Draglines (Walking)
*Bucyrus-Monighan Co.

Dredges
*Bucyrus-Erie Co.
Hetherington & Berner, Inc.
*Morris Machine Works

Driers
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy Van Saun Mfg. & Eng. Co.
Lewistown Fdry. & Machine
Lime & Hydrate Plants Co.
*Link-Belt Co.
McCarter Iron Works, Inc., The
McLanahan & Stone Corp.
*Traylor Eng. & Mfg. Corp.
Tyler Co., W. S.

Drill Bit Reconditioning
*Bucyrus-Erie Co.

Drill Bits
*Ingersoll-Rand Co.

Drill Sharpening Machinery
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drill Steel
*Ingersoll-Rand Co.

Drilling Accessories
*Bucyrus-Erie Co.
Gardner-Denver Co.
*Ingersoll-Rand Co.
Timken Roller Bearing Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
*Bucyrus-Erie Co.
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drills (Core)
Hoffman Bros. Drilling Co.
*Ingersoll-Rand Co.
Pennsylvania Drilling Co.

Drills (Diamond)
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Drifting)
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drills (Hand Hammer)
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drills (Rock)
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drills (Sinking)
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drills (Stoping)
Gardner-Denver Co.
*Ingersoll-Rand Co.

Drills (Wagon)
Gardner-Denver Co.
*Bucyrus-Erie Co.
*Ingersoll-Rand Co.

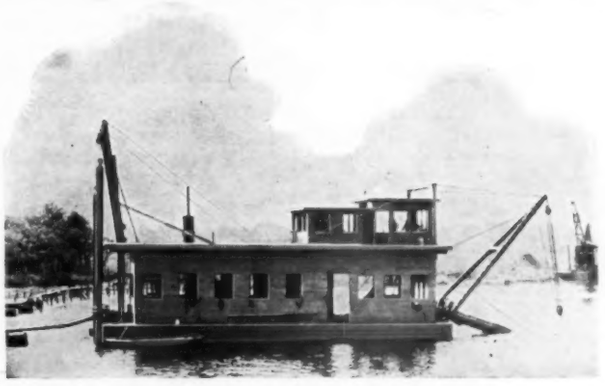
Drills (Water Well)
*Bucyrus-Erie Co.

Drills (Well) (See Drills—Blast-Hole)

* See also information in the 1938 Pit and Quarry HANDBOOK.

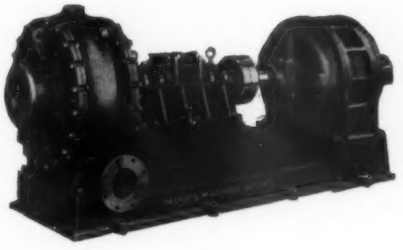
The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



It was a tough dredging job, but . . .

Sand and gravel producers will be interested in this report of a Morris Dredge owner: "Probably no dredging equipment in Florida has handled more troublesome material, yet our Morris Dredge has repeatedly handled heavy material at an average cost of 25 cents per cu. yd. This cost includes everything—depreciation, insurance, maintenance, etc. Working with ordinary flowy river sand, this equipment will operate at a cost averaging 15 cents per cu. yd. We commend Morris Dredges to any who seek the best that money and technical brains can develop." Write for bulletin describing Morris Dredges and what they are doing for other sand and gravel producers.



Replacements with a bonus . . . .

On severe services, such as handling abrasive materials, pump parts which are subject to wear are bound to give out eventually. When they do, a replacement becomes necessary, and this is where you can get a bonus from Morris. Recent advances in Morris Pump designs have developed such astonishingly high efficiencies that a new Morris impeller, suction throat ring or casing will frequently produce a marked decrease in power consumption as well as equalling or even exceeding the original pump capacity. Remember the Morris bonus when you need new parts for old Morris installations or need new pumps for any requirement.

For authoritative recommendations on any pumping or dredging problem, write to Morris Machine Works, Baldwinsville, N. Y.
Representatives in Principal Cities.

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Drives (Multiple Belt, Chain, Rope)
Chain belt Co.
*Link-Belt Co.

Dust Arresters
*Blaw-Knox Co.
Clark Dust Control Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Collecting Systems
*Blaw-Knox Co.
Clark Dust Control Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Conveying Systems
Allen-Sherman-Hoff Co.
*Blaw-Knox Co.
Clark Dust Control Co.
*Fuller Company
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Filters
Clark Dust Control Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dynamite (See Explosives)

Electrodes (Welding)
Stulz-Sickles Co.
Taylor-Wharton Iron & Steel Co.
Wall-Colmonoy Corp.

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Elevator Buckets (See Buckets—Elevator and Conveyor)

Elevators (See Conveyors and Elevators)

Elevators (Portable)
Barrett-Cravens Co.

Eliminators (Soft Stone) (See Soft Stone Eliminators)

Engineers
*Arnold & Weigel, Inc.
Bacon, Inc., Earle C.
Cross Engineering Co.
*Fuller Company
Hetherington & Berner, Inc.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lime & Hydrate Plants Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
*Sprout, Waldron & Co.
Sturtevant Mill Co.
*Traylor Engr. & Mfg. Co.

Engine Generator Sets
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Engines (Diesel)
Caterpillar Tractor Co.
Cummins Engine Co.
*Ingersoll-Rand Co.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Engines (Internal-Combustion)
Caterpillar Tractor Co.
Cummins Engine Co.
*Ingersoll-Rand Co.
Murphy Diesel Co., Ltd.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Engines (Steam)
*Ingersoll-Rand Co.
*Morris Machine Works
*Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
*Haiss Mfg. Co., Geo.

Explosives
Atlas Powder Co.
National Powder Co.

Fabricating (Electric Arc and Oxy-Acetylene)
Stulz-Sickles Co.

Fans (Exhaust)
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Arnold & Weigel, Inc.
Chain Belt Co.
*Fuller Company
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.

Filters (Oil)
Hilliard Corp., The

Forges (Oil)
Gardner-Denver Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.
National Powder Co.

Gaskets
Quaker City Rubber Co.
Republic Rubber Co.

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Gates (Bin) (See Bin Gates)

Gates (Clamshell)
*Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
Chain Belt Co.
*Link-Belt Co.
*Sprout, Waldron & Co.

Gears and Pinions
Chain Belt Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Sprout, Waldron & Co.

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Murphy Diesel Co., Ltd.
National Supply Co. of Del.
Superior Diesel Engine Division of the National Supply Co.

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Glass Sand Equipment
Lewistown Foundry & Machine Co.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grapples
Erie Steel Construction Co.
Owen Bucket Co.

Grating (Steel)
*Blaw-Knox Co.
*Hendrick Mfg. Co.

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Grizzly Feeders
*Link-Belt Co.
*Traylor Engr. & Mfg. Co.

Grizzlies
*Eagle Iron Works
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mach. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Hard Facing Metals
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Heaters (Bitumen)
*Easton Car & Construction Co.

Hoists
Commercial Shearing & Stamping Co.
Gardner-Denver Co.
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
*Jaeger Machine Co.
McLanahan and Stone Corp.
*Sauerman Bros., Inc.
Smith Engr. Works
*Sprout, Waldron & Co.

Hoppers
*Chicago Bridge & Iron Co.
*Hendrick Mfg. Co.
*Link-Belt Co.

Hose (Air, Steam and Water)
*Ingersoll-Rand Co.
Manhattan Rubber Mfg. Co.
Quaker City Rubber Co.
Republic Rubber Co.

Hose Couplings (See Couplings)

Hose (Fire and Suction)
Quaker City Rubber Co.

Hose (Radiator-Engine Cooling)
Quaker City Rubber Co.
Republic Rubber Co.

Hydrate Plants (Comp.)
Lime & Hydrate Plants Co.

Hydrators
Lime & Hydrate Plants Co.

Hydraulic Guns (See Guns—Hydraulic)

Idlers
Chain Belt Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
*Sprout, Waldron & Co.

Indicators (Material Level)
*Fuller Company

Joist and Slab Machines (Concrete)
R. & L. Concrete Machinery Co.

Kilns and Coolers (Rotary)
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lime & Hydrate Plants Co.
*Link-Belt Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Kilns (Vertical)
*Arnold & Weigel, Inc.
*Chicago Bridge & Iron Co.
*Hardinge Co., Inc.
Lime & Hydrate Plants Co.

Kominuters
*Smidth & Co., F. L.

Ladders (Agitating Dredge)
*Eagle Iron Works

Ladders (Hydraulic Dredge)
*Eagle Iron Works

Lime and Hydrating Plants
*Arnold & Weigel, Inc.
*Chicago Bridge & Iron Co.
*Hardinge Co.

Lime-Handling Equipment
*Arnold & Weigel, Inc.
*Chicago Bridge & Iron Co.
*Fuller Company
*Hardinge Co.
*Link-Belt Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Robins Conveying Belt Co.
*Traylor Engr. & Mfg. Co.

Lime Kilns
*Arnold & Weigel, Inc.
*Chicago Bridge & Iron Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lime & Hydrate Plants Co.

Lime Plants (Complete)
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime Putty Plants
*Chicago Bridge & Iron Co.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
*Bucyrus-Erie Co.
Chain Belt Co.
*Fuller Company
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.
*Sprout, Waldron & Co.

Locomotives (Diesel)
Davenport Locomotive Works
*Whitcomb Locomotive Co.

Locomotives (Diesel-Electric)
Davenport Locomotive Works
*Whitcomb Locomotive Co.

Locomotives (Electric, Gas & Steam)
Davenport Locomotive Works
*Lima Locomotive Works

Locomotives (Gas-Electric)
Davenport Locomotive Works
*Whitcomb Locomotive Co.

Locomotives (Oil Electric)
Davenport Locomotive Works
*Whitcomb Locomotive Co.

Locomotives (Storage Battery)
Davenport Locomotive Works

Locomotives (Trolley Battery)
Davenport Locomotive Works

Magnetic Pulleys (See Pulleys, Magnetic)

* See also information in the 1938 Pit and Quarry HANDBOOK.

One SLY UNIT FILTER CONTROLS DUST from

ONE or TWO VIBRATING SCREENS for 24c PER DAY

★ The data for this series of advertisements describing actual dust control installations in crushed stone plants is taken from our files. The advertisements are presented to help you conform to insurance regulations, state and local laws, and to improve working conditions. They explain how one Sly Unit Filter effectively and economically controls several sources of dust at one time.

INSTALLATION NO. 2

With one inexpensive **SLY UNIT FILTER** operators of small and medium sized plants are keeping their plants free from dust due to screen operations (of one or two vibrating screens) at a *power cost of as low as 24c per day.*

Sly Unit Filters have the greatest amount of filtering capacity per square foot of space. They are simple, sturdy, completely contained units including exhaust fan, 3 to 5 H. P. motors, special flat cloth filter bags and filter bag shaking device. These bags, woven to our specifications, are exceptionally durable and long lasting assuring efficient dust collection with low upkeep.

Sly Unit Filters—No. 22 for one screen and No. 34 for two screens—can be installed inside or outside of your plant in a space only 6 feet square. A 7" pipe connection to a hood on each vibrating screen is usually adequate for suppressing the dust. Connecting the screen hood to the filter with a pipe is as easy and inexpensive as connecting a pipe on a kitchen stove.

For 24c a day you, too, can have a clean plant in which to work and produce. Your workmen will become more efficient. The cost of replacing bearings and gears worn by dust will be eliminated.

Write today for Bulletin, P-93.

THE W. W. SLY MANUFACTURING COMPANY

4745 Train Avenue **Cleveland, Ohio**

BRANCH OFFICES IN PRINCIPAL CITIES

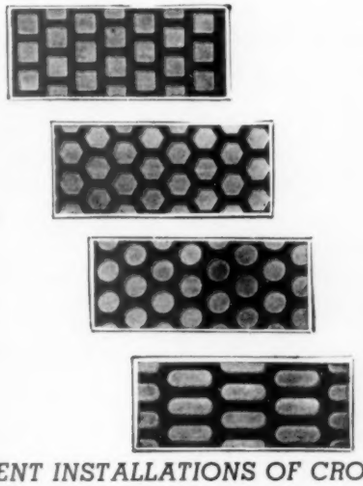
BLAST CLEANING EQUIPMENT **SLY** TUMBLING MILLS

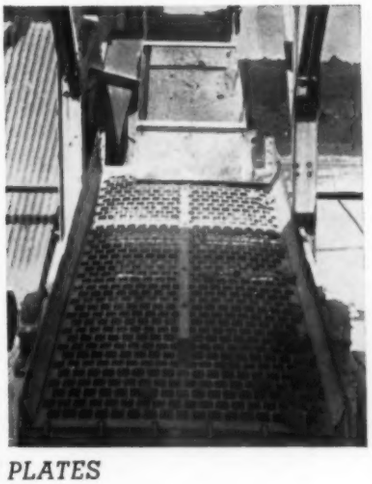
DUST CONTROL EQUIPMENT FOR EVERY INDUSTRIAL PURPOSE

CROSS

PERFORATED PLATES AND SECTIONS FOR VIBRATING, ROTARY AND SHAKING SCREENS

Openings exact size and shape for best sizing. Accurate workmanship, saves installation cost. Selected and specified, long wearing steel. Prompt, reliable service.





TWO RECENT INSTALLATIONS OF CROSS PLATES

CROSS ENGINEERING CO.

MAIN OFFICE & MFG. PLANT **CARBONDALE, PA.**

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Taylor-Wharton Iron & Steel Co.

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Taylor-Wharton Iron & Steel Co.

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Republic Rubber Co.

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*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

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*Traylor Engr. & Mfg. Co.

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*Brooks Equip. & Mfg. Co.
*Hardinge Co.
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*Smidth & Co., F. L.
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*Williams Patent Crusher & Pulverizer Co.

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*Sprout, Waldron & Co.

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*Chicago Bridge & Iron Co.
Frog, Switch & Mfg. Co.
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Taylor Forge & Pipe Works

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Naylor Pipe Co.
Taylor Forge & Pipe Works

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Universal Concrete Pipe Co.

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Naylor Pipe Co.
Taylor Forge & Pipe Co.

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*Link-Belt Co.
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*Austin-Western Road Machy. Co.
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*Gruendler Crusher & Pulverizer Co.
*Link-Belt Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

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Kent Machine Co.
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Cummins Engine Co.
Murphy Diesel Engine Co.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

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*Research Corp.
*Western Precipitation Corp.

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*Hazard Wire Rope Division of The American Chain & Cable Co., Inc.
*Leschen & Sons Rope Co., A.

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Anchor Concrete Machy. Co.
Kent Machine Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

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*Blaw-Knox Co.
Erie Steel Construction Co.
*Jaeger Machine Co.
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*Link-Belt Co.
*Sprout, Waldron & Co.

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*Sprout, Waldron & Co.

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*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.

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*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Brooks Equip. & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Raymond Pulverizer Div. of Combustion Engr. Co., Inc.
*Smidth & Co., F. L.
Straub Mfg. Co.
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*Williams Patent Crusher & Pulverizer Co.

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*Fuller Company

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Gardner-Denver Co.
Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
*Jaeger Machine Co.
Kansas City Hay Press Co.
*Morris Machine Works

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*Morris Machine Works

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Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

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Hetherington & Berner, Inc.
*Ingersoll-Rand Co.
Kansas City Hay Press Co.
*Morris Machine Works

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*Morris Machine Works

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*Fuller Company
*Ingersoll-Rand Co.

Pumps (Vertical)
*Morris Machine Works

Pumps (Well)
*Morris Machine Works

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Kent Machine Co.
Multiplex Concrete Machinery Co.
Stearns Mfg. Co.
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*Traylor Engr. & Mfg. Co.

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Stulz-Sickles Co.
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Wall-Colmonoy Corp.

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Cross Engineering Co.

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Chain Belt Co.
*Link-Belt Co.

Sand-Lime-Brick Machinery
*Hardinge Co.

Sand Separators
*Link-Belt Co.
McLanahan and Stone Corp.
Simplicity Engr. Co.
Smith Engr. Works

Sand-Settling Tanks
*Chicago Bridge & Iron Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Smith Engr. Works

Scales
*Merrick Scale Mfg. Co.

Scales (Track and Truck)
*Merrick Scale Mfg. Co.

* See also information in the 1938 Pit and Quarry HANDBOOK.

THERE MUST BE A REASON

FOR

CONTINUED POPULARITY

For nearly nine years Pit and Quarry has led all other papers in this field in subscriptions among producers. It is the most popular paper—with its popularity constantly growing, as is shown by the increasing number of subscriptions and the increasing margin of lead.

The reason? At no time has Pit and Quarry compromised with its high editorial standards. It has held its editorial staff, and kept its field editor on the road, wearing out a car in one to two years. The illustrations have always been plentiful, the articles easy to read.

Costly to do this? Yes, it is. But it has been worth the cost, for producers realize that Pit and Quarry has worked *with* them. Savings effected by change from biweekly to monthly publication have been passed on in the form of a reduced subscription price—not pocketed. And the high percentage of subscribers who renew their subscription attests their loyalty to a publication understanding their problems and working *with* them.

The subscription price is still only one dollar for a full year's service. If you are not already a subscriber, why not send in a dollar and learn why other producers find Pit and Quarry so valuable? The cost is so small—the results so large—don't delay.

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PIT AND QUARRY PUBLICATIONS,

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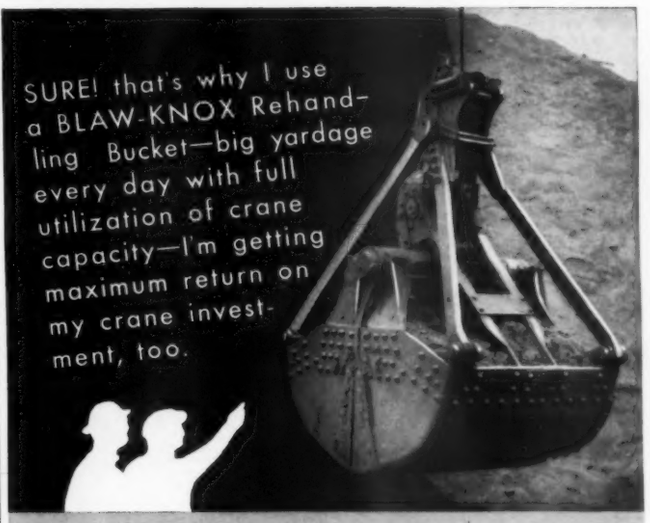
SURE! that's why I use a BLAW-KNOX Rehandling Bucket—big yardage every day with full utilization of crane capacity—I'm getting maximum return on my crane investment, too.

Bulletin 1606 entitled Blaw-Knox Buckets for Contractors shows how to select a bucket to secure the profitable difference between peak and ordinary performance—it will be sent on request.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PA.

BLAW-KNOX
REHANDLING BUCKETS

Tisco

The soundest specification for wearing parts in 1939

Resolve, now, to include in all specifications for 1939, *wearing parts of TISCO Manganese Steel.* For no other steel provides the uniformly long and low-cost service which TISCO affords. For no other steel is TISCO made... with uniformly correct manganese content, and exacting control in every manufacturing and heat treating process. Be *sure* you get all the benefits of this tough, long-wearing steel in '39, by making sure all wearing parts are TISCO made.

PUMP PARTS · CUTTER HEADS · DIPPERS · DIPPER TEETH · BUCKETS · RACK AND PINIONS · CONVEYOR CHAIN · JAW PLATES · CHEEK PLATES · MANTLES · SCREEN CLOTH WELDING ROD · GRINDING BALLS · HARD SURFACING ROD, ETC.

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BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Scrapers (Power Drag)
*Austin-Western Road Machy. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

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Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Haiss Mfg. Co., Geo.
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*Hendrick Mfg. Co.
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Sturtevant Mill Co.
Taylor-Wharton Iron & Steel Co.
*Traylor Engr. & Mfg. Co.
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*Tyler Co., W. S.
*Universal Crusher Co.

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*Tyler Co., W. S.
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*Gruendler Crusher & Pulverizer Co.
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Chain Belt Co.
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*Hendrick Mfg. Co.
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*Koehring Co.

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*Eagle Iron Works
*Haiss Mfg. Co., Geo.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Smidth & Co., F. L.
Smith Engr. Works
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.

Weighing Equipment (Automatic)
*Blaw-Knox Co.
Erie Steel Construction Co.
*Fuller Co.
*Jaeger Machine Co.
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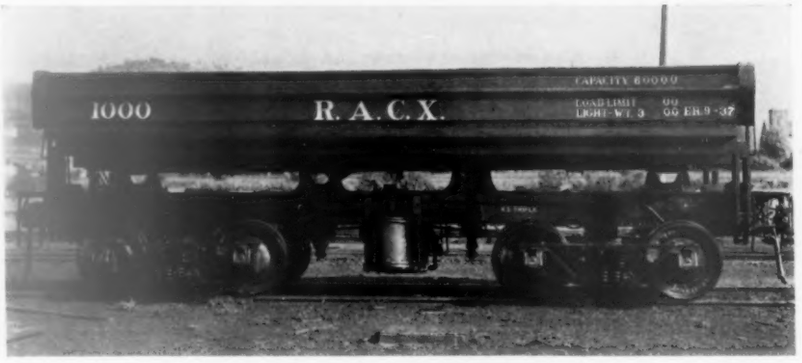

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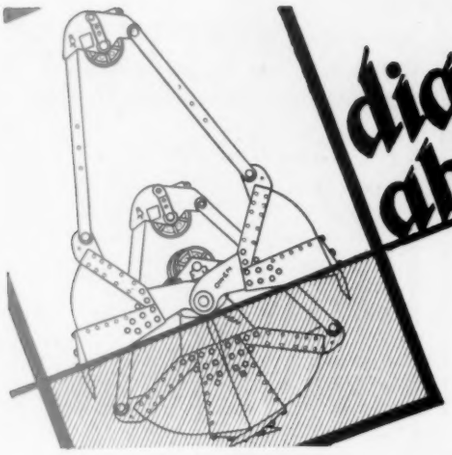

digging ability is an inherent characteristic of every Owen Bucket.

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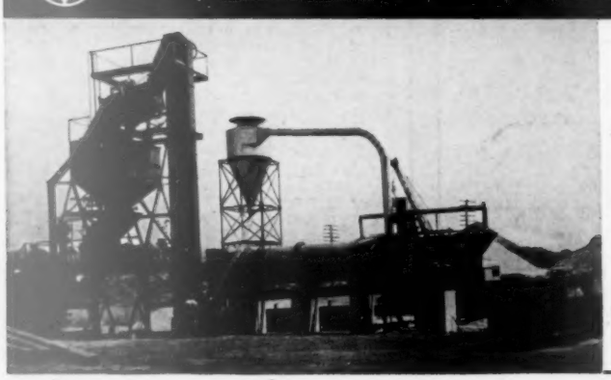
BITUMINOUS PAVING MACHINERY



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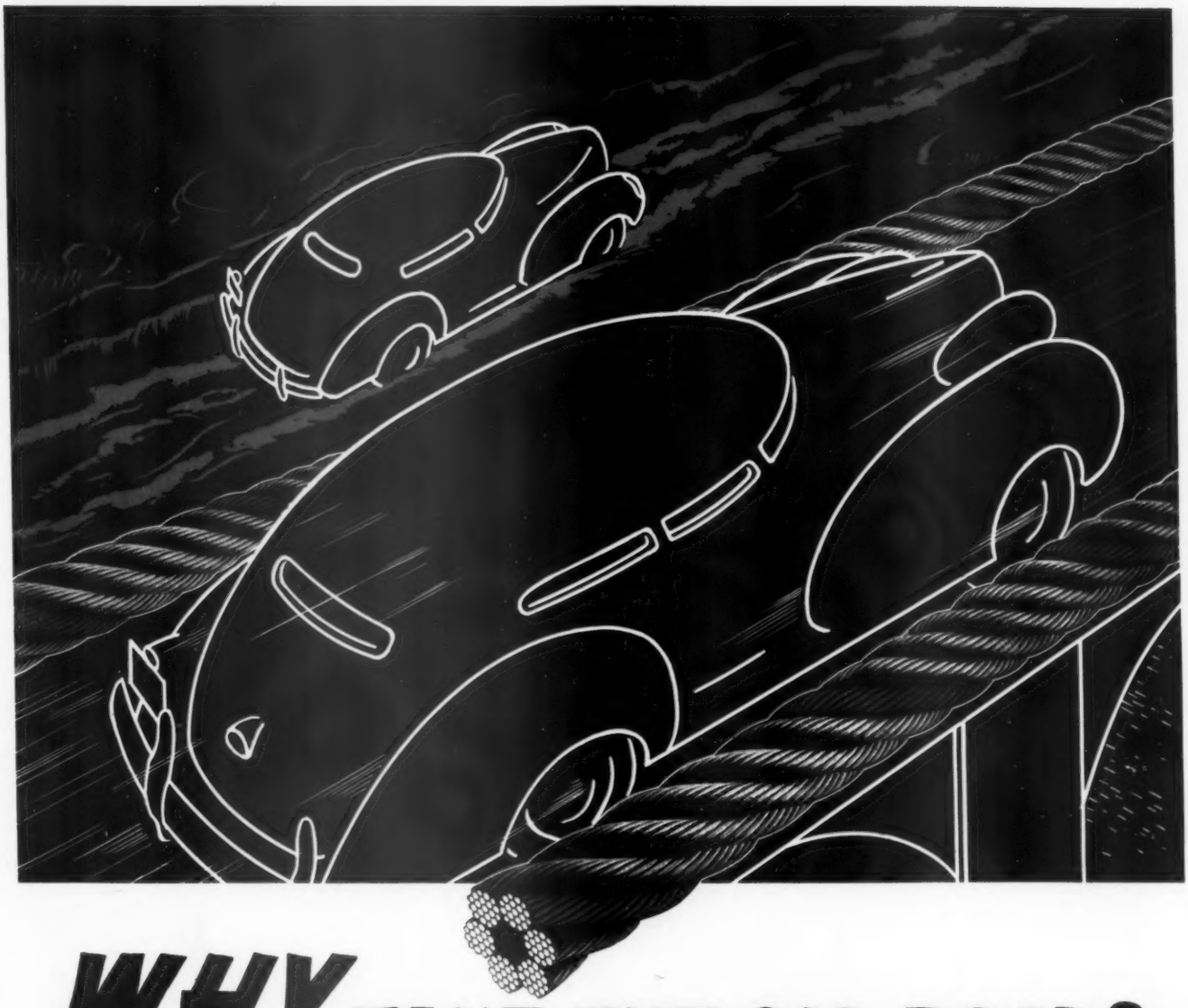

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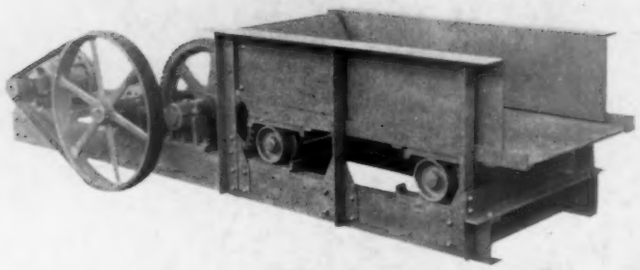
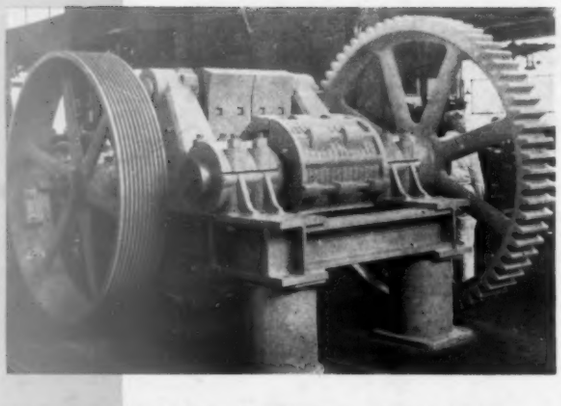


RECIPROCATING FEEDER

Heavy duty adjustable reciprocating feeder. V belt drive push button control. Delivers shovel loaded or any size material to machinery. Equalizes power. Saves wear and tear — Eliminates delays.

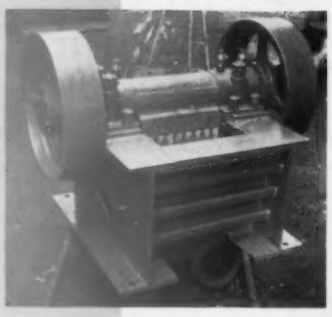


PRIMARY CRUSHER

Giant all-steel Crusher for handling shovel-loaded limestone. Hopper removed showing Manganese segment roll, interchangeable and reversible crushing plant liners. V-belt drive, Alemite lubrication.

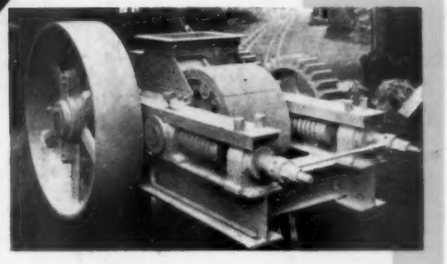
DOUBLE LL CRUSHER

All-steel patented Segment Double Roll Crusher. Gear guard and roll cover removed to show segment rolls. Built in a wide range of capacities.



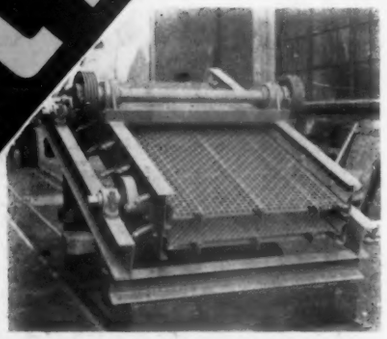
JAW CRUSHER

All-steel adjustable force-feed and discharge Jaw Crusher. For use in portable or semi-portable and stationary plants.



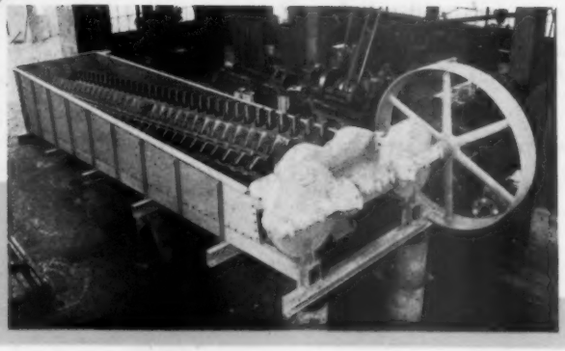
SHAKING SCREEN

Single or Double-Deck adjustable V-belt driven shaking screen.



Only time and experience can build the ruggedness and dependability that you find in McLanahan equipment. The high capacity per horse-power, and low maintenance per service-year, have made McLanahan reduction machinery the first choice of the limestone, sand, gravel, rock products and ore industries for more than a century.

Only a few representative machines of the complete McLanahan line are shown on this page—write for a catalog of the equipment in which you are interested.



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